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The Book of Knowledge

The Children's Encyclopædia

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Volume I.

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This is a short guide only to the principal contents of this volume. It is not possible to give the titles of all the Poems and Rhymes, Legends, Problems, colour pages, questions in the Wonder Book, and many other things that come into the volume; but in all cases are given the pages where these parts of our book begin. The full list of these things comes into the big index to the whole work.

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INTRODUCTION

READING these books in my mature years, but calling my boyhood self to sit beside me in the reading, I realize what they would have brought to him in those long gone days on the prairies. What I cannot now carry to him, my boyhood self, except as he lives with me in the city or wherever I go in these grown-up days, I can in some measure help to bring to those who are now as he was then; and so I most gladly accept the invitation to write a few words of introduction, though I think that not many of the numberless readers of these volumes, young or old, will stand at the door very long, listening to any one telling of what is within, for every boy or girl, even if grown into man or woman, will find something of compelling interest in these pages. My own lads played no ball the day these books were brought home, nor did they wait to hear my preface, so eager were they to see and to read the articles themselves.

I read these books first in the midst of the busy, noisy, distracting city, and I found myself thinking that their pages were like automobiles, or aeroplanes or street cars or railway trains, carrying the city child into the country among the trees and rocks and birds and brooks and grass and mountains and clouds, where he could see and hear about the wonders of Nature. I read them again on top of a hill, underneath an oak tree, seated on a rock, where I could see mountains all the way round on the horizon; and then I thought how these magic volumes would bring all the great achievements of man, the wonders of his inventing and discovering, to those shut in by the mountains or by the sky on a little patch of flat plain or prairie.

So I am glad to introduce these books to the boys and girls in America, both of the country and of the city, that they may know something of the heritage which comes to them from being born in this world full of mystery, and upon this earth where billions upon billions have lived and left each a little, at least, for those coming after them, — a heritage which is for the most part beyond the reach of the unaided senses of these boys and girls, and which they can occupy as their own only by the help of those who have added the lenses of microscopes and telescopes and other instruments to the lenses of their eyes, who have read in rocks or bones or words the memories of the ages gone, or who have travelled far beyond their horizons in the present. And it is a happy fact that any boy or girl who has a good mind can, with such help, have that great and wonderful and beautiful world added to what he or she can actually see or hear or touch or smell or taste, — added to a little stretch of city, or village street or a few square miles of farm land.

What these books bring is not to take the place of a hard disciplining of the mind. The ability to perform such deeds as are here related comes not merely by reading of them. That power is developed only by days and nights of work and sacrifice. No amount of mere information can make up for the lack of these, as no amount of reading about the water will in itself qualify one to swim or to build a vessel. But this information may furnish the incentive to work and sacrifice and give to one actually in struggle the benefit of the experience of the thousands who have made that struggle before.

I often call the boys in the public schools of New York my millionaires, not because they have, or ever will have, millions of dollars of their own, but because they have millions upon millions of minutes to spend. A boy of ten for example has a prospect of living until he is seventy (though the life insurance companies do not, I believe, allow him so high an " expectation "), which means that he has a fortune of over thirty millions of minutes. Of those millions he will have to spend nearly a third, or ten millions, in sleep, and another third in earning his food, shelter, clothing and other necessities of life. But he will still have a large fortune left to spend as he pleases. The failure or success, at any rate the largeness or narrowness, of his life will depend largely on how he pleases to spend this surplus, — and the poor boy will be as free and as able to spend it profitably as he who has millions of dollars; he can make himself a rich man in character, and knowledge, and influence.

Suppose a boy of ten were to spend fifteen minutes a day (about one-hundredth of his income) in reading these pages, omitting those too young for him or those which require him to give hours in following directions for doing or making certain things, he would probably be able to finish these volumes in two or three years, and he would at thirteen know more about the earth and the life on it than the wisest men knew a few generations ago. For example, though it took men ages to devise an instrument that would carry the human voice across a great distance, yet a boy of twelve can in an hour or two learn how that instrument, the telephone, is made and operated. And this encyclopædia is full of such information to help the boy begin his youth or manhood a little farther on than his ancestor.

I would have this work in every school as a library of supplementary readings —readings that will not be looked upon as " lessons." Indeed one might teach a child almost entirely from these volumes, for several years. But this encyclopædia is primarily a home book and not a school book. It is not like a grown up encyclopædia, a work of reference which one does not think of reading consecutively or for pleasure (though I have myself read through an encyclopædia of several volumes and found it intensely interesting and profitable reading). This is an encyclopædia in that it gives the child or youth possession of the whole cycle of existence and circle of truth to which he is entitled by birth. The city boy and the country boy find themselves inhabitants of a universe a thousand times more wonderful and interesting than that which most of their elders knew at their age or dreamed of. And I can think of no good reason for keeping them from it. The facts of physics, biology, astronomy, history and language learned in these boyhood, girlhood days are never forgotten. Through them the child has inextricably woven into his being the life of the race and of the earth, who might otherwise be only a child of a certain valley or prairie, or of a certain street or tenement.

I often go back to Abraham Lincoln and try to imagine what this or that means or method of modern education would have been to him. Would it have helped or hindered in the making of such a man? Would these richly illustrated, absorbing books, I ask myself now, have tempted him from the later hard mastery of the few books that fed his genius? Would they have made too easy the path to the knowledge which mankind has reached by the direst suffering? It is possible that this would be the effect upon a sluggard or a vain mind, but the former would not in any case hold itself to Lincoln's course of discipline, unless it found such spur as lies in these pages, and the vanity of knowledge is so rare in the child's mind and so easily cured that it needs not to be considered. A normal child's eager mind, this encyclopædia can but nourish and protect, — a mind that knocks inquiringly at all doors and drinks at all fountains, pure and impure. Here is a sanitary fountain, that bubbles up to every thirsty child. Here is a door that opens upon healthful fields.

The American home, especially in the city, is menaced by so many economic and social influences that one is glad to encourage any effort that will work against these. This little library making the child's world revolve around the place of its reading, will make many a home a more attractive centre of boy and girl life. The hearth has disappeared, but if such a library of good books could take its place, drawing the family about it, the social value of the hearth would be restored where now the cheer has flown into the street. So again I commend these as home books.

I have spoken of the boyhood self who sat beside me in the reading. But his opinion is not wholly untouched of age. I therefore turn to one of those thousands for whom all this treasure has been gathered and ask him to give ending to this introduction. He, a boy of seven, was being nursed because of a serious hurt and would be read to. And the book that he asked for was the last volume of the BOOK OF KNOWLEDGE.

JOHN H. FINLEY.

TO OUR READERS YOUNG AND OLD

OUR work is done. For many months your editors have been working to make these books for children, their own and others. You cannot find any other set of books like them, for no one ever thought before of trying to put together all those things which will help boys and girls to understand themselves, and the great world around them, in simple, clear words.

In order to make themselves able to write the articles for you, the editors and their assistants have read many books, printed in many languages; they have looked into the laboratories where scientists are working to solve the many puzzles of the world around us, and to find its secrets; they have gone through the busy workshops where the things we use every day are made; they have worked in hospitals where men and women struggle to conquer disease; they have selected from the whole field of our literature some of the most beautiful thoughts; they, or those working for them, have gone to and fro over the whole earth to find interesting things and have brought back stories and pictures for you to read and to see.

They have told you the stories of the sky, the sea, the earth, and of life upon the earth; and have shown you how one thing affects another. They have shown how the rain, the wind, the heat, the cold, the life of plants and animals in ages gone by, make possible our life to-day. They have told you the story of man from the beginning. The story of all the great nations which have risen and ruled on the earth has been given you that you may see where they succeeded, where they failed, and what they added to the world.

You will find that next to the United States, more space is given to England than to any other country. England gave us our language, much of our literature, and many of our customs and laws. One cannot really understand the United States unless he first understands England.

Your editors, English and American, have worked together to make a book for English speaking children no matter where they live. We have made a book for the boy on the lonely Australian sheep farm, as well as for the girl in the New York apartment house. Boys and girls on Dakota wheat farms, among the Scotch mountains, on Southern cotton plantations, in the far-away Philippines, in India, in Africa, will all find that the book has much for them. Wherever boys and girls speak English, sets of these books — yours and ours — will go, to help them to become bigger, wiser, better men and women. With every set will go the good wishes of all the editors who have worked with the book until they love it.

HOLLAND THOMPSON.

THE PURPOSE OF OUR BOOK

THIS work is an attempt to bring together that part of human knowledge really worth while, so that even a child may understand.

Nothing could be more false to its purpose than to imagine that it seeks to cram the mind with things that children need not know. It is based upon a definite idea of education which the editors have developed both from study and experience and which they have worked out in the volumes now before you. It conceives the bringing up of a child as the supreme task in which we can engage, but it has no sympathy with those who would set a child down at a desk almost before it can run. It believes that in its early years a child is its own teacher, and that in a right environment it will teach itself more than all the teachers in all the schools could teach it.

It cannot be urged against this book, therefore, that it has come to steal away the joy of childhood and put a bitter grinding in its place. It has come, indeed, to bring more joy to childhood, believing that true joy of life comes from sympathy and understanding.

One half of the population of the world is made up of boys and girls learning at school and little children playing at home. Is it beyond the resources of our language to convey to this vast number of potential men and women such an understanding of the world they live in as shall make their young lives happier, and save the waste of precious years at school? The creators of the book believe that it is not, and in that belief they have built up the simplest system of knowledge that they can devise.

Left to wander in this field, the child will find whatever it wants. For the youngest of all, its nurse will find her lullaby. The child in the nursery will find its nursery rhymes, and all the best stories that have ever been told. The child who can be left out of doors to play will find here the beginning of its interest in natural things. All the games and pastimes, all the fireside enjoyment the children love, the mechanical interests of boys, the domestic interests of girls, and home-made toys for both of them — this is but one phase of the practical value of the book. For the boy and girl at school these pages teem with precious things; for fathers and mothers, teachers and governesses, they may well become invaluable. It is a book for grown-ups and children too — to be read *by* children or *to* children. It is an encyclopædia of everything that comes into childhood, and by childhood is meant all that period of life when the sensitive mind is being formed by the influences about it.

THE BOOK OF KNOWLEDGE is what it pretends to be. It is written in the words the children know. The art of saying things simply has long been dying out, but the writers of this book will seek to revive it. They will be simple by being natural; they will make a children's book without childishness, a book that children may read because it is simple, and that men may read because it is plain. The great mysteries will be made as clear as words can make them; and while the child will find its sense of wonder grow, it will find, too, that its mind is widening all the time, understanding more and more.

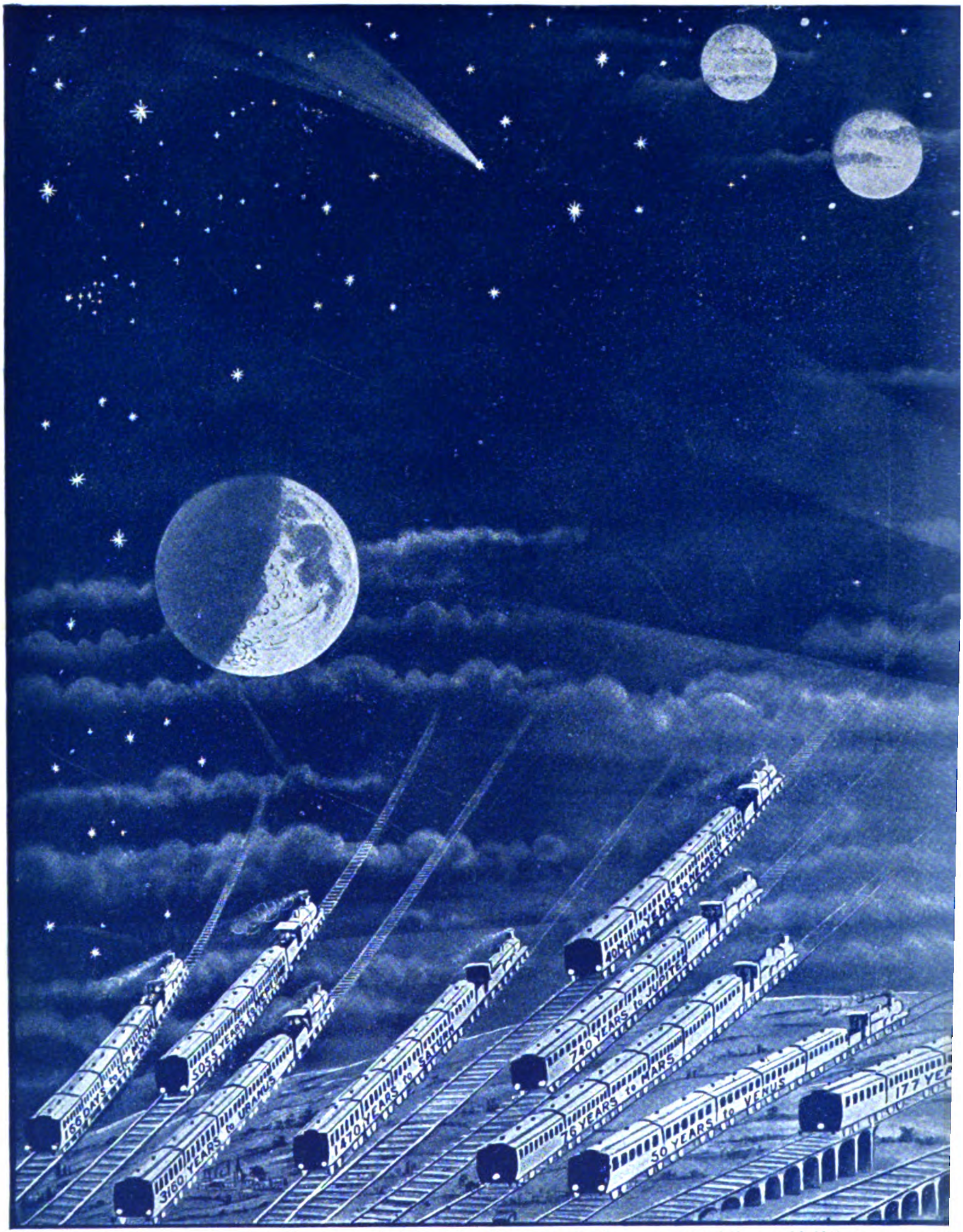
We shall teach by words and pictures too. It is one of the great qualities of this work that the most important things are told three times. Let us, for example, consider the story of the telephone. In the simplest words that he can use, Mr. Harold Begbie explains the mystery of talking over wires. At the head of his article the matter is summarized in clear phrases, so that from the beginning the reader has the central point in mind. Under the pictures the whole story is retold, so that the pictures by themselves may be clearly understood. It may be doubted if there is a single person who can fail, after reading this story, to understand the telephone.

The value of a work in which this method is applied to everything needs no emphasis. If saving of time is lengthening of life, this book should be a priceless gift of years to the generation that is coming. There can be no doubt which of two children a teacher would prefer to take — one familiar with this book or another who is not. Nor can there be much doubt that this book in the hands of boys and girls will add immensely to their understanding, lightening the burden and shortening the years of their school-life.

Here is a gift to the world; a thing of measureless value to parents and teachers; a treasury for children to which they may come whenever they will, for whatever they will; an inspiration to childhood which will make these precious years a time of happy building-up. It is a story that will never fail, for children who will never tire; and it is the best of all stories, told in the simplest of all words, to the greatest of all ends.

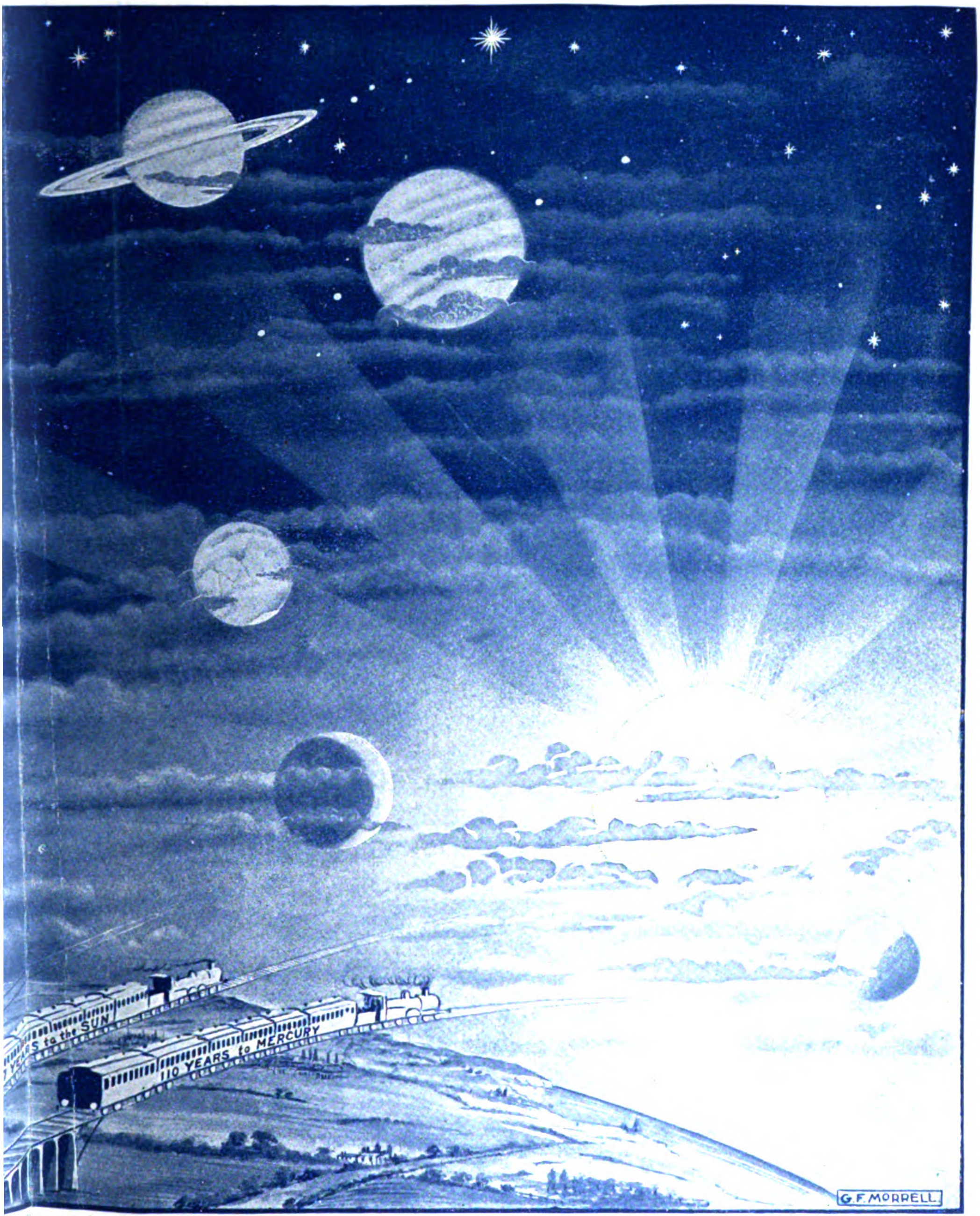
ARTHUR MEE.

THE SPACE NO MAN CAN MEASURE: FLYING FO



This picture helps us to realise what our minds can hardly understand—the wonderful size of the universe, and the immeasurable distances in space. These trains represent the fastest means of travel that men have yet been able to invent, the express train, travelling a mile a minute fast enough to go round the world, if there were a ra twenty days. Yet such trains as th we can see them, would take 177 year there were a railway on which they

R FORTY MILLION YEARS TO THE NEAREST STAR



a railway and nothing to stop it, in less than as these, which dash past us almost before years to travel from the earth to the sun, if they could travel a mile a minute and never stop; and a train starting from the earth for the nearest star would not arrive for forty million years! Our artist has drawn an imaginary railway line leaving the earth for the planets, and the figures on the trains give the time it would take the trains, travelling all the time at sixty miles an hour, to reach the planets.

The Child's Story of THE EARTH

THE WORLD AND THE UNIVERSE

THE earth on which we live is so big that we cannot possibly see it all at the same time. It has come to be what it is through millions and millions of years. Yet the earth is only one of many, many worlds, some of them much greater than the earth, all of them moving through space like a ball when it is thrown in the air. The moon was once a part of it, before it broke away. What do we know of all these worlds? How were they made? Is every star a sun like ours, and are there little children playing on balls, like the earth, that circle round the stars? How did the moon break away from the earth? How does the sun give us life and warmth? All these questions we ask as we think of the great universe in which we live, and we come to know more and more about the world as time goes on. In this part of our book we shall learn all that we can about these wonderful things.

THE BIG BALL WE LIVE ON

By DR. SALEEBY

At the bottom of the sea live creatures which do not know what light means, but always live in utter darkness. They have neither eyes nor ears, and they can only feel. The world as these creatures know it is just of two kinds—part of it feels as if it could not be eaten and part of it feels as if it could. There is no day or night; there are no seasons, no sun, moon, or stars; no sounds, no beauty of any kind; nor do they even know that there are in existence any other creatures like themselves.

It is as if a child spent its life in utter darkness in bed, with nothing to see or hear, and with only one kind of change in all its life—the change between having something in its mouth and having nothing. That is not the sort of life that any of us would wish to live, though there are people in the world whose life is not much better.

How different our own life is! We have many senses, or gateways of knowledge, as they have been called. Some of these are unimportant, such as taste and smell. Even the sense of feeling or touch is not of any very great importance, and the same may be said of the sense of heat and cold. Then there comes the wonderful sense of hearing, by which many different kinds of knowledge reach us, as well as many things that are beautiful—like the song of a bird, the sound of the sea, the voices of our friends, and that wonderful thing called music. But far better than all these as a gateway of knowledge is the sense of sight. Through sight we find out a never-ending number of wonderful things. Sight shows us the ground beneath our feet and the heavens above us; the sun, moon, and stars, the shooting stars, the lightning, and the sunset. It shows us our own bodies and the bodies of our friends, and a whole host of living creatures of many kinds. Sight tells us—and here our sense of heat and cold helps us also—that time is divided into hours of light and hours of darkness.

This common fact of day and night is really wonderful when we think of it. The commonest things are the most wonderful, if we look at them not merely through the eyes of our heads, but also through the eyes of our minds. This wonderful sense of sight tells us also of changes which do not come and go as rapidly as day and night, yet which never fail to come in their due order; which go as surely as they come, and return as surely as they go.

After months of cold and snow and ice, there follows what the poets have called "the birth of the year." The days get longer; the buds come out in the trees and hedges; the birds sing more sweetly; the world puts on a new green dress; the air becomes warm and the sun hot—we pass through spring to summer. Everyone knows that summer will not last always; the power of all the wisest men in the world cannot keep it for us. The corn becomes ripe for harvest and it is early autumn; the leaves become brown, the flowers wither, and then they seem to die; the leaves drop from the trees, and all the green and beautiful plants seem dead.

THE GREAT CHANGES THAT ARE ALWAYS GOING ON

Autumn gives place to winter, with its cold and snow, but when spring comes the trees that seemed dead become green again. They did not really die, and they are as surely alive in winter as in summer; but they must obey the changes of the year. These changes will all come back again and again and again, just as night follows day. They were going on thousands of years ago, and will be going on in thousands of years to come. The creatures that live in darkness at the bottom of the sea know nothing of them, but we do, and, just like the trees, we have to live our lives in a way that fits them. In the daytime we are awake; at night we sleep.

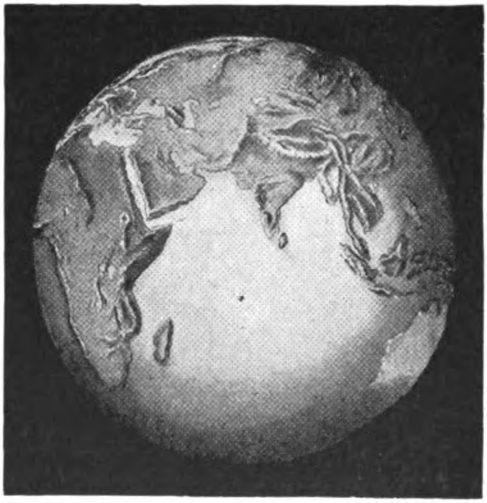
In the summer we can do things which we cannot do in the winter, and we have to change our clothing—though we lighten our clothing when the trees put on theirs, and put on more clothes just when the trees strip themselves. It is our business, then, to understand the secret of all these things.

Sight is the most precious of all the senses, not merely because it tells us so much more than any other sense about our own earth, but also because it shows us a great and beautiful and wonderful world far beyond the world in which we live.

ONE OF THE MOST WONDERFUL THINGS WE CAN THINK OF

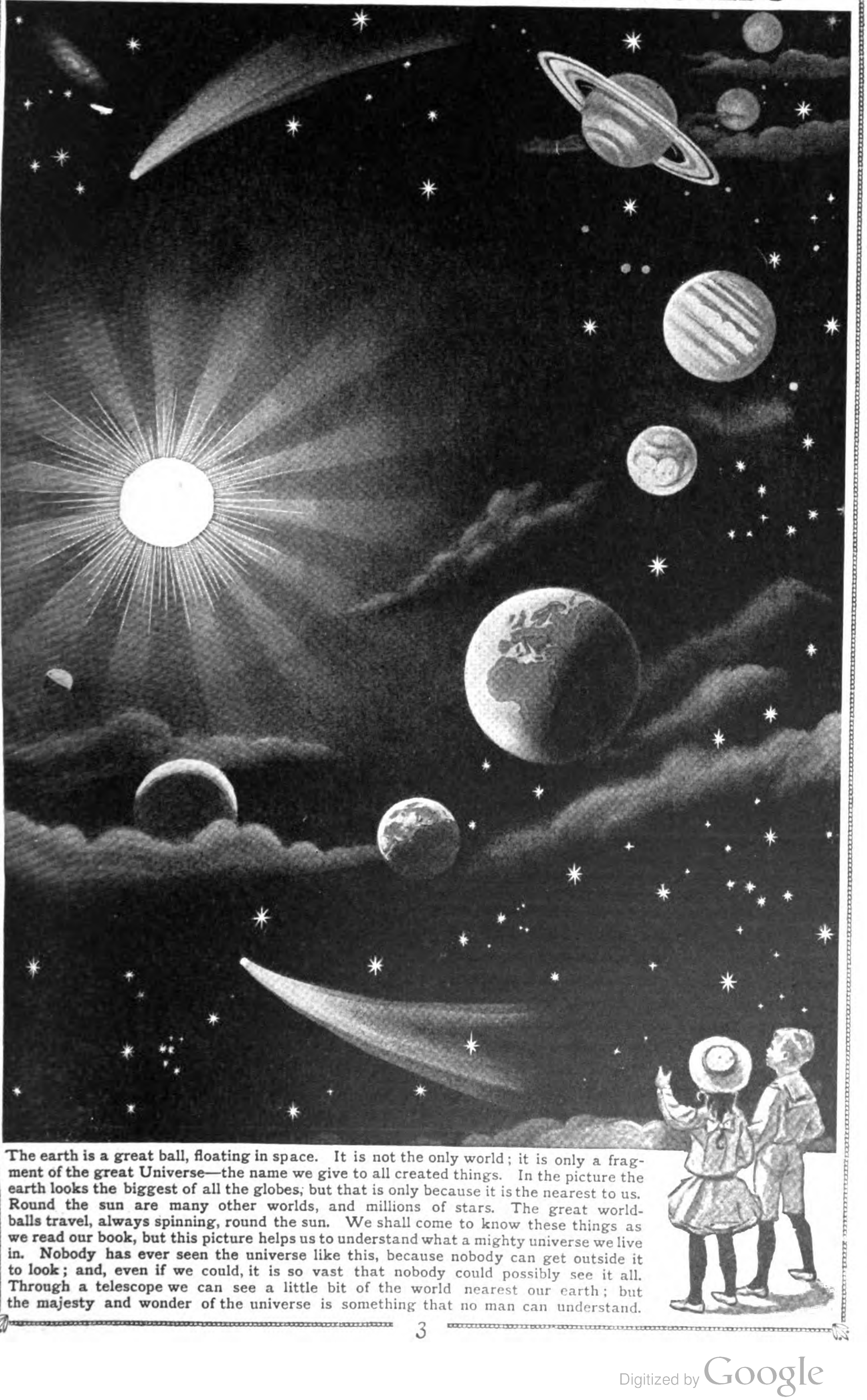
All our other senses put together could never tell us about this. Our own earth, because it is ours, because we cannot leave it, and because it affects our lives so closely, is of most interest to us. Yet we find, when we look beyond the earth, that things which are far away, things which we can never reach or touch, but can only see, are of great importance to us. Chief among these is the wonderful sun—the great fire which keeps us warm and gives us light and heat. Without the sun nothing could live upon the earth, neither the creatures at the bottom of the sea, which never see the sun and do not know of its existence, nor we ourselves, who see it nearly every day. Then there is the moon, which often gives us light at night, and there are the thousands of stars which make us ask what they are. We all know the rhyme about the twinkling little star, "How I wonder what you are?" The answer to this question is one of the most wonderful things that we can think of.

But even if we never raised our eyes above us, or, at any rate, never looked higher than the tops of the hills and mountains, we should find far more things to wonder about than any man can understand in a lifetime; more, indeed, than all the men of all times put together have yet been able to understand a millionth part of. We shall never be able to answer all the questions that might be asked, and yet every answer that we do obtain, and every question that we ask properly—even if we never get an answer to it—is of value to our lives. Everything that men find out is of value to us, and the things that men have already found out make our lives happy and useful, and make all the difference between our own lives and the miserable lives of savages, which to us seem scarcely worth living



The World is round like a ball, and this is the side of the ball called the Old World, the part of the World that was known before Christopher Columbus found America. The rough part of the ball is land, and the smooth part is water. There is much more water than land on the earth.

THE PROCESSION OF THE WORLDS



The earth is a great ball, floating in space. It is not the only world; it is only a fragment of the great Universe—the name we give to all created things. In the picture the earth looks the biggest of all the globes, but that is only because it is the nearest to us. Round the sun are many other worlds, and millions of stars. The great world-balls travel, always spinning, round the sun. We shall come to know these things as we read our book, but this picture helps us to understand what a mighty universe we live in. Nobody has ever seen the universe like this, because nobody can get outside it to look; and, even if we could, it is so vast that nobody could possibly see it all. Through a telescope we can see a little bit of the world nearest our earth; but the majesty and wonder of the universe is something that no man can understand.

at all. The more we know and the more we understand—even though it be very, very little as compared with all that there *is* to know and understand—the better for us all.

This is a fact worth thinking about at the very beginning. These questions cannot be asked and answered without trouble. Every one of us must give some part of his life to them; and many men, and many women, too, have given their whole lives to them. Why should we trouble at all? some boy or girl may ask. Why should we not just play and eat and sleep all the time? Why should we not be like those creatures at the bottom of the sea, which seem to say of all the world around them, "I do not know, and I do not want to know, and I do not care; it makes no difference to me, and I cannot be bothered with it"?

This is the other side of the ball, the New World, called America, which the men living in the Old World did not know until Columbus found it, four hundred years ago. America is the greatest country in the World, so big that it takes nearly a week to go across it in a fast train.

Well, there are men and women and children who live just like that; but it is not really *living*. If you live like that, your life is worth just about as much as that of the creature at the bottom of the sea, which never thinks about anything—not even about the other fishes or about itself. The only thing that makes that kind of life worth living is that it may lead to something higher. If we ourselves are to live that sort of life, then all the time and struggle and labour which has been needed in the past for us to live at all has been thrown away, and we have spoilt it all in a moment. It tumbles down like a house of cards, and we tumble with it. Ours is the highest kind of life there is, and the higher the kind of life we live the more we need to know and understand. Perhaps we should feel this for ourselves if all our gateways of knowledge were suddenly closed, if all that we remember were forgotten, and if we became like creatures that live in darkness.

THE VERY BEGINNING OF THE STORY OF THE EARTH

Well, we have let our eyes roam in many ways around us, up to the heavens and down to the bottom of the sea. Now we must begin at the beginning of our story, and tell it as it really happened. This is all very well when you are telling a story about something you have seen yourself, but it is a very different thing when you were not there, but have come in at the end, so to speak, and have to find out what happened by what you see around you when you get there. We have all heard about clever detectives who go into a room where thieves have broken into a safe, and find out all about it. They make a note of everything they see, examine a piece of a tool that the thieves dropped, the finger-prints on the door of the safe, and so at last, if they are clever and fortunate, they are able to find out what happened, even though no one saw the burglars at their work.

Now that is what men have to do in telling the story of the earth, and if we are going to tell the story well, we shall have to do what a writer does when he is telling a detective story. He begins by saying what the detective first thought when he came upon the scene, and how, as he found out one thing after another, he began to put his story together bit by bit until at last the whole thing was as plain to him as if he had been looking in at the window all the time.

HOW THE FIRST MEN WERE PUZZLED ABOUT THE STORY OF THE EARTH

Now, the story of the earth is far more puzzling, as it is far more interesting, more wonderful, and more glorious, than any detective story that ever was written or ever will be written; and when men began to think about it first they were very easily deceived. They were misled by what seemed to be plain enough, but was really very different from what it seemed to be. Until they got these mistaken notions out of their heads, they could not get any further.

Suppose you want to go upstairs to your bed-room, and you start by walking one step down to the kitchen, it is quite plain that, however well and bravely and fast you go on walking downstairs, you will never get to your bedroom. The simple truth is that you have started the wrong way, and that will never do. Well, men started the wrong way in trying to find out the story of the earth. It was not their fault, for the wrong way looked like the right way. They were clever men, and did not mean to be beaten. The harder they worked the more difficulties they got into.

THE MEN WHO THOUGHT THE EARTH WAS FLAT

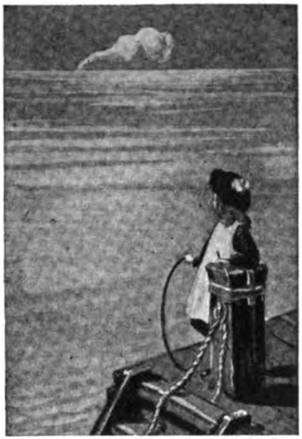
Now, the first man who tried to understand the earth would naturally think that there were, at any rate, two or three great facts which he could start with, about which there was no doubt at all. To begin with, it seemed quite plain that, though there were hills and valleys, ups and downs, yet, on the whole, the earth was *flat*. The hills and the valleys seemed to be mere ups and downs, like the ups and downs on a bad road, or on a badly-rolled cricket ground. However far you walk your head is still upright, at the top of you, and your feet are still beneath you. You will never come to an edge and fall off. Walking on the earth, or even going in a train, is not at all like walking on a ball, as people do at the circus.

Well, then, men thought that here was something plain. First of all, there was this great stretched-out earth, giving us a certain level upon which we live, and stretching out in all directions. Then men began to think of everything else in the whole world as either *at that level* or else *above that level* like the sky, or else *below that level*. It was not possible to get very far down below because of the difficulty of digging; but still, just as there was an *above*, so men knew that, of course, there must be a *below*.

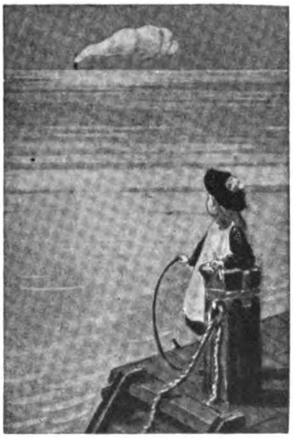
THE GREAT MYSTERY OF THE UNDER WORLD

In some parts of the world it was possible, men thought, to get hints of the lower regions, and men came to learn that the earth below was hot and on fire. How did they find this out? Here and there upon the surface of the earth there are great holes, usually found at the tops of mountains. These mountains have a special name which we must learn; they are called *volcanoes*, and the holes are called *craters*. Sometimes a volcano becomes excited, and all sorts of things come up from below and are shot up into the air through the hole at the top. Now, these things that come up are all terribly hot, and with them comes a great deal of black smoke. So it seemed probable that what men called the *under world*—that is to say, the part below the level of the earth—was a very hot place, probably with fire always burning in it.

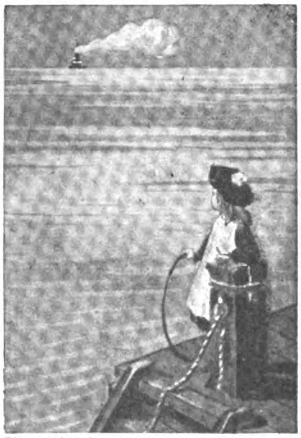
Well, now we have got so far as to have in our heads a clear notion of the flat place we live on, an *up* to the heavens and a *down* to the lower regions; *but the greater part of all this is nonsense*, and the more men believed in it the more nonsense they invented.



The earth is not flat like a table, but round like an orange. We know this by the way a ship comes into sight **at sea. At first we see only smoke.**

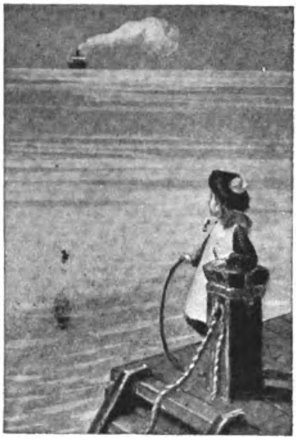


Then we see the top of the mast, as if the ship were climbing up the side of a hill.

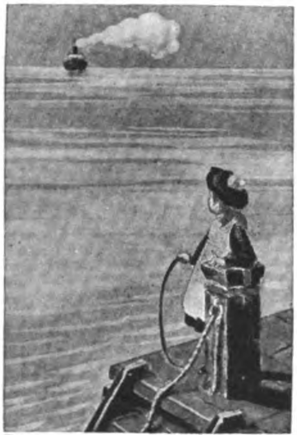


Then the front appears, and we see the vessel rising higher and higher

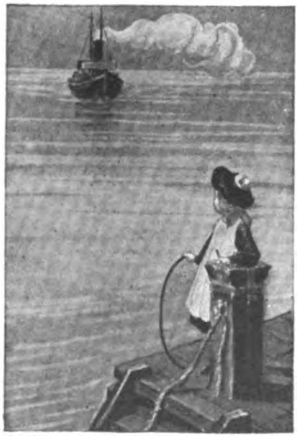
HOW WE KNOW THE EARTH IS ROUND



If the earth were flat we should see the whole of the ship at once, not the front of it first and the rest of it bit by bit.



But we do not see it that way. We see the ship rising as if it were sailing up the other side of a ball.



At last the ship is over the circle, sailing clear on the top of the ball.

HOW WE KNOW THE EARTH IS ROUND

It seemed certain that the earth was flat, and if there was one other thing that seemed certain, it was that the earth was quite still and at rest. We do not feel the earth moving under our feet; we cannot imagine that it moves. If we look "up" to the stars and watch them carefully from day to day and from night to night, they seem to come up from the edge of the earth, in a direction which we call the East. Then they seem to travel across the sky, and then to dip down at the other edge of the earth, which we call the West.

WHAT MEN USED TO THINK ABOUT THE SUN

We can easily see the sun doing this, as he seems to do it every day. At some time in the morning we see him in the East; he travels across the sky, and then he passes from our sight in the West. It used to be thought that the great fire of the sun was put out every night in the water in the West, and that then, in some mysterious way, it passed through the under world, and was set blazing again, and turned up next morning in the East to begin its journey afresh. Whatever happened to the sun at night, at any rate there seemed to be no doubt that it did what we think we see it do—rise in the morning, move across the sky, and set on the other side from where we first saw it rise. The notion that the earth itself moved seemed to be such nonsense that everybody laughed at it.

But at last there came the notion that, in spite of what we think, the earth is not flat! Some bold men actually declared that the earth was nothing else than a big ball, and that we lived on the outside of it. Many people laughed at such an idea. "If it is a big ball," they said, "we should be able to go right round it and come back to where we started from." Now, in those days the only part of the earth that men knew at all was scarcely more than a spot on its surface, and beyond this they knew nothing. So this idea of travelling boldly out in one direction and going on and on in a straight line until you came back to the place you started from seemed really too absurd.

COULD A MAN TUMBLE OFF THE EARTH?

Then, again, people argued that there could not possibly be other people on the under side of this big ball, for if they were they would fall off, and, indeed, if it were a ball, anyone starting at the top of it, and walking too far in one direction, would soon find himself beginning to slip—just as a doll might slip off an orange—until at last he would tumble off altogether, and that would be the end of him. It seemed a great puzzle, or, rather, it seemed not a puzzle at all; it simply seemed that the people who said the earth was a ball were talking nonsense.

But these people would not stop talking, and they went on with one argument after another so strongly that at last people believed that what they said was true. One of their best arguments was that if you watch a ship as it sails out to sea from the harbour, it does not behave as it should behave if the sea were flat. Suppose the sea were like a flat, ploughed field. You could watch the ship go up and down and on and on, looking smaller and smaller, until at last it became just a speck, and then disappeared out of sight. But that is not at all what happens when a ship sails out to sea. If we watch it closely, we find that it begins to disappear in a particular way. The *hull*—that is, the bottom—of the ship disappears first, and then the ship seems to sink lower and lower, until we can only see the tops of the masts, and then only the top of the highest mast, and then nothing at all. When it has quite gone, the ship is really near enough for us to see quite well, but it is hidden by something—something which first hides the lowest part, and then hides it all.

HOW THE SHIP COMES INTO SIGHT AT SEA

Then, supposing the ship comes back, what do we see? Is it, first of all, a sort of dim shape, which gradually becomes clearer and clearer, like a man meeting us in a street in a fog? Not at all. The ship seems to rise up from somewhere, and, as it rises, comes nearer and nearer, so that we see the tops of the masts first and the hull last. What happens is exactly the same as what happens when we stand half-way up a little rounded hill, and a friend leaves us, going over the top until we can only see his head, and then nothing at all. Then the friend comes back to us over the hill, his head appearing first and his feet last. It is the same with the ship. Exactly the same thing happens in each case. The ship has gone round the corner, so to speak, though it is *over* the corner rather than *round* the corner. We cannot see it because the earth itself (it happens to be the sea, but that does not matter) is between us and the ship.

THE FIRST MEN WHO TRIED TO SAIL AROUND THE GREAT EARTH-BALL

"Very well, then," said some bold sailors. "Very well, then; if the earth is really a ball, and if there is water enough, we shall sail around it. We shall start out from the edge of the land with our best boats and a big supply of food, and we shall go straight on and on and on, though we see nothing but water in front of us; and if you are right, and if we sail long enough and our food does not run short, we shall go right round the ball and turn up again at the place we left"—not at the same edge of the land, but at the opposite edge.

And that is what these sailors tried to do. They went out in their best and biggest boats; they turned their boats straight ahead, and waved their hands to the crying friends who thought they would never see them again. The country called Spain, now quite friendly with us, which was at that time one of the most famous countries in the world, was their starting place. On they went, and we may imagine how often those sailors, who could not believe this story about the earth being round, wanted to turn back and get home again. Every day they felt they were sailing further from their homes, and what way back could there be except the way they had come?

But there was to be no turning back. Each day their leaders gazed ahead, looking for land—land that had never been seen, but which they hoped to be the other side of the land from which they had started. And once they nearly found what they were looking for. It was not a great stretch of land that they saw, only some small islands, but that was quite enough, they thought. Where there were islands, they said, there would surely be land beyond them.

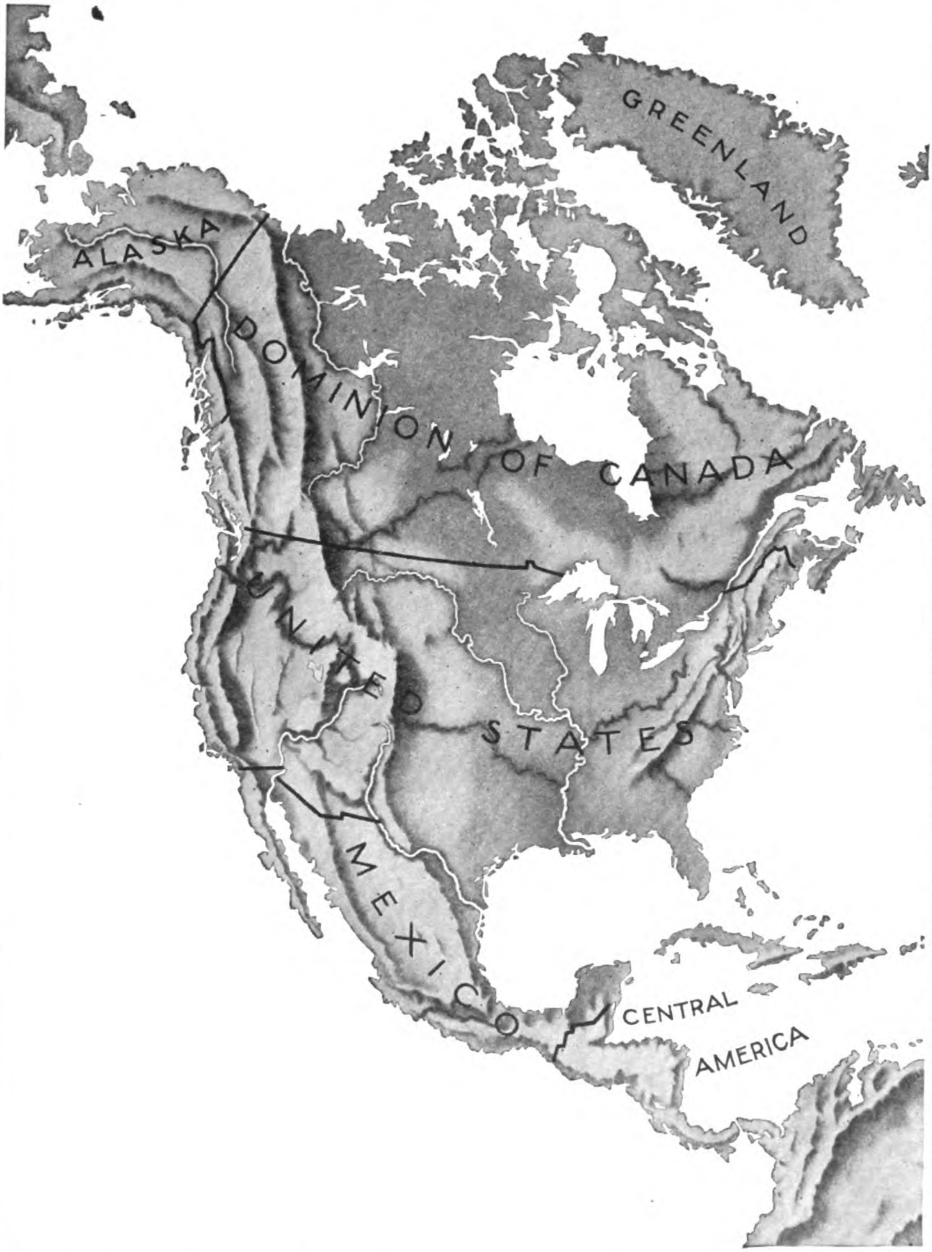
HOW MEN FOUND THAT THE EARTH IS A GREAT BALL

Now, in those days, people who lived in Spain, and in that part of the world, used to call the land which lay furthest East from them the Indies—it is the same word as India. So when the sailors came across these islands, they thought that, by going round the other way, they had reached some of those same Indies which they had visited before by travelling East, and they called these islands to which they first came the *West Indies*, and the Indies they had left behind them they called the *East Indies*. Little did those bold sailors guess that instead of going all the way round they had gone only a quarter of the way. But they had done one great thing. *They had gone out West across the sea, and had found land.*

This was the beginning, and a great beginning. Soon there followed other sailors, equally brave, and at last they succeeded in sailing right round the earth. That was the end of the notion that the earth was flat. These voyages discovered for us what we still call the New World, and they have been of great importance to the lives of all of us. But their greatest importance was really to prove for ever that this wonderful earth is nothing else than a great ball.

The next story of the earth is on page 77.

THE SURFACE OF NORTH AMERICA



This map of North America shows the land itself with its streams and mountains. You can recognize the four great slopes of which you are told. Notice the narrow slope down to the Atlantic Ocean, the great plains in the Mississippi Valley, the Rocky Mountains, the great highland west of them, and then the Sierra Nevada and the Coast Range. You can see how far down the ice sheet came, and how far the Gulf of Mexico once reached.

From the Natural Introductory Geography, copyright 1897, 1907, by the American Book Company.

THE HISTORY OF OUR LAND

IN this story and those that are to come after we are going to tell you the story of the United States from the earliest times of which we know anything down to the present. If you read it carefully the editors hope that you will not find it dull and that you will find many things that you will be glad to know. In this story we shall learn what part of the land first rose from the sea, something of the plants and animals that lived in the old days. We shall learn that a great part of our country was once covered with a sheet of ice over a mile thick, and what it did. Then we shall learn something about the men that the white men found here.

THE LAND BEFORE THE WHITE MEN CAME

By HOLLAND THOMPSON

HAVE you ever thought about what this country of ours was like before there were any white men here? You have all heard that Columbus discovered America in 1492, but that is only a little more than four hundred years ago, while our country is millions and millions of years old. You all know that you live in the United States and are proud of the fact, I am sure. You have heard your father say that another man was a good citizen and you knew that it meant something pleasant. You boys and girls too want to be good citizens. Now in order to be good citizens, you must know something about the great country in which you live, for an ignorant man cannot be a very good citizen. Citizens have something to say about how they are governed and unless you know something about what has happened in the past, how can you tell what is best now?

Now look at the rather queer map of our country which is printed with this article. On it towns, cities, railroads and other works of man are not shown at all, but only mountains, rivers and plains, all the work of Nature. This is called a relief map and is interesting for many reasons. In another part of our book you will learn how mountains and valleys affect rainfall and climate and upon these two men's success upon the earth depends. In a climate too hot or too cold, too wet or too dry, men cannot work well.

On this map you will see that the rivers and smaller streams even in the same neighborhood run in different directions, but if you look more carefully you will find that generally their water reaches the same place. This is not always true. Sometimes the water of springs only a few yards apart finally enters the sea hundreds of miles apart.

Perhaps some of you have been to Asheville among the mountains of western North Carolina. If so you remember that the train stops just after it comes out of a long tunnel through a mountain, and beside the railroad you will see a little spring tumbling down the mountain side. Throw some bits of paper into the stream and watch them. Soon the stream divides, some of the paper is carried east and some is carried west. The water that flows west will finally reach the Gulf of Mexico, while the other stream finally reaches the Atlantic Ocean.

THE GREAT DIVISIONS OF OUR COUNTRY

Our country has only four great slopes, one toward the Atlantic, one toward the Gulf of Mexico, one toward the Great Lakes on the north, and one

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toward the Pacific Ocean. The Great Lakes finally empty into the St. Lawrence River and this flows through Canada into the Atlantic Ocean also. All the land in one of these slopes is not alike, and the climate and the soil also differ very much, but still all these are generally more alike than they are in other great divisions.

Suppose we could fly in a gigantic aeroplane from the Atlantic to the Pacific, what would we see?

Let us start about the middle of our Atlantic coast, so that we shall pass over Washington, our capital city. First there is a stretch of low, level land raised only a few feet above the level of the sea. There are many streams which flow very slowly. Sometimes in fact they seem to flow away from the sea instead of into it as the tides from the ocean rush in. This stretch of land is called The Coastal Plain. Going further west we see below us hills and valleys through which the streams flow quite rapidly. In many of the streams are waterfalls, when the streams suddenly drop from a higher to a lower level and there are many factories. This region is called the Piedmont Plateau. (The word " Piedmont " means " at the foot of the mountains.")

THE HIGHEST MOUNTAINS IN THE EASTERN PART OF THE UNITED STATES

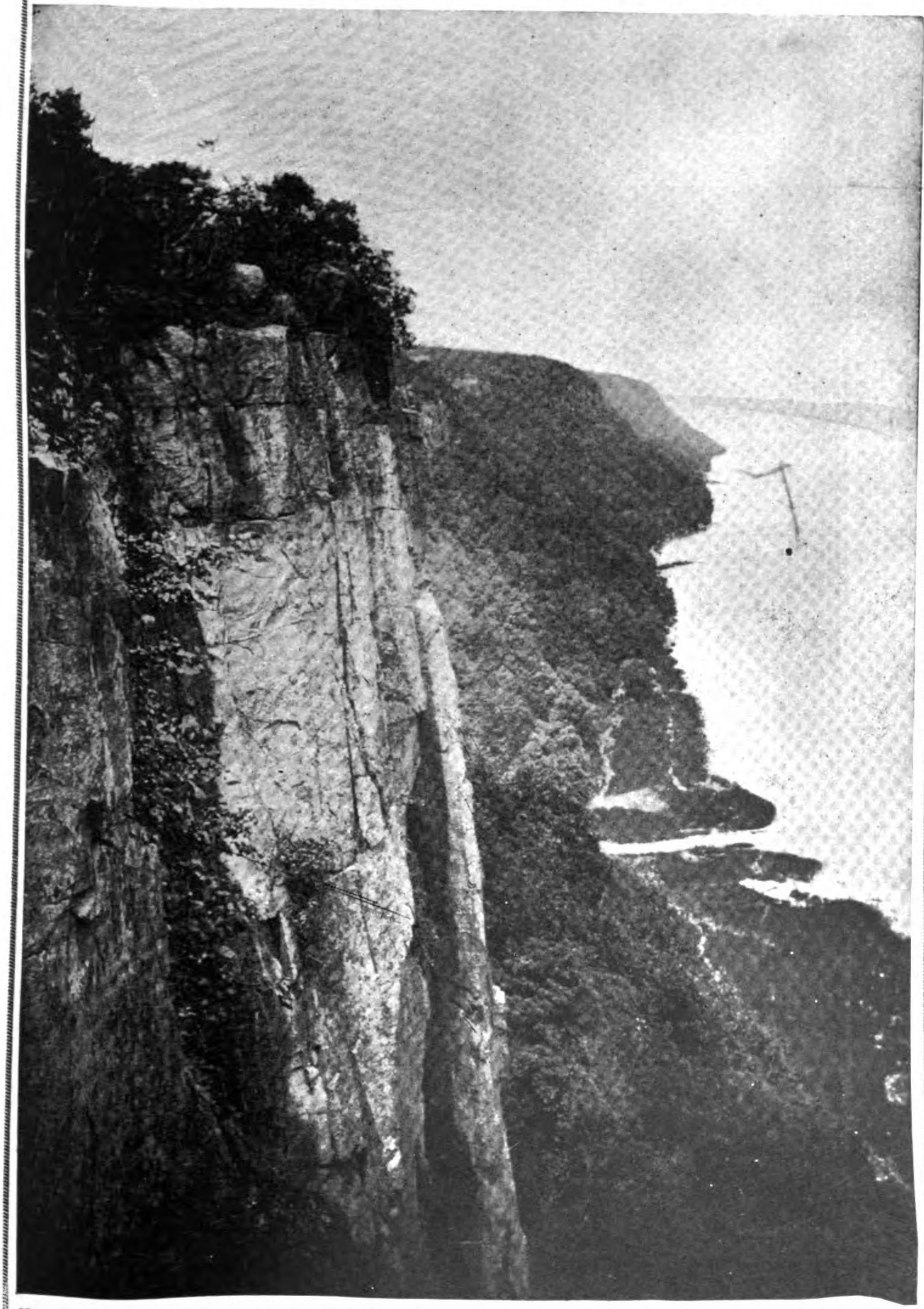
Sailing steadily westward, we find that our machine must rise higher in the air for we are coming to mountains. These mountains are not so high as some we shall see in the west, but still many points are more than a mile high. The highest are Mt. Washington in New Hampshire to the north of us, 6279 feet high, and Mt. Mitchell in North Carolina to the south of us, 6711 feet high. Most of them are much lower, however, and we shall learn more about them later. In these mountains are mines of coal and iron.

Crossing these mountains we again see hills, but soon we reach the low level prairie region, in which are the most fertile farms of the United States.

There are fields of corn and wheat which extend for miles. We see herds of fat cattle and many pigs which will give us beef and bacon. This is one of the finest farming regions in the world, but it has many cities also. On we go mile after mile until we reach the great Mississippi River, one of the greatest rivers in the whole world. Beyond the Mississippi are the same low plains with their fertile farms, but finally the ground begins to rise again. The land no longer seems so green, farms are fewer, but we see many half-wild cattle wandering about grazing on the short grass, and we come to a region which is called the Cordilleran Highland. First we come to the Rocky Mountains on the east, then a high rocky hilly region with little rainfall and then the Sierra Nevada and the low Coast Range further west. Some of these mountains are very high. In the state of Colorado are thirty peaks each of which is more than two and a half miles above the level of the sea. Through this region are rich mines of gold and silver, and other metals, hardly less valuable. Then the level slopes down to the Pacific Ocean in a region of abundant rainfall where farming of every sort flourishes.

If we were to cross the land further north or further south we would not find exactly the same sort of land, occupations or people. For example, further north in addition to the mountains we should pass over thousands of lakes, some large, some very small. We should see hundreds of factories and many cities in the eastern half of the country. If we crossed much further south, there would be fewer lakes, fewer factories, but we should find cotton, sugar cane and oranges growing, and we should find almost no hills at all until we reached the far west. Somewhere in the United States we find almost every kind of soil, climate and product. Plants which belong to the Arctic Zone grow in the mountains of New England, and in some parts of Florida, California and Louisiana the summer lasts the whole year round. Some of our country is wet and swampy all the time, but another part is a real desert.

PALISADES OF THE HUDSON



The Palisades of the Hudson extend northward from Fort Lee, New Jersey, about fifteen miles along the west bank of the river. These rocky cliffs, 300 to 500 feet in height, are entirely unlike the other rock of the neighborhood. Centuries ago the crust of the earth cracked, and these huge masses were forced up because of the great heat below and then cooled.

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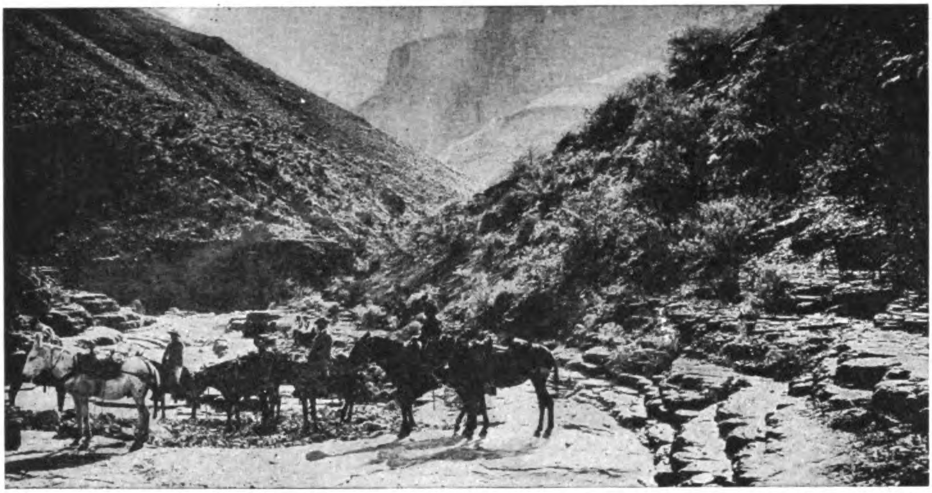
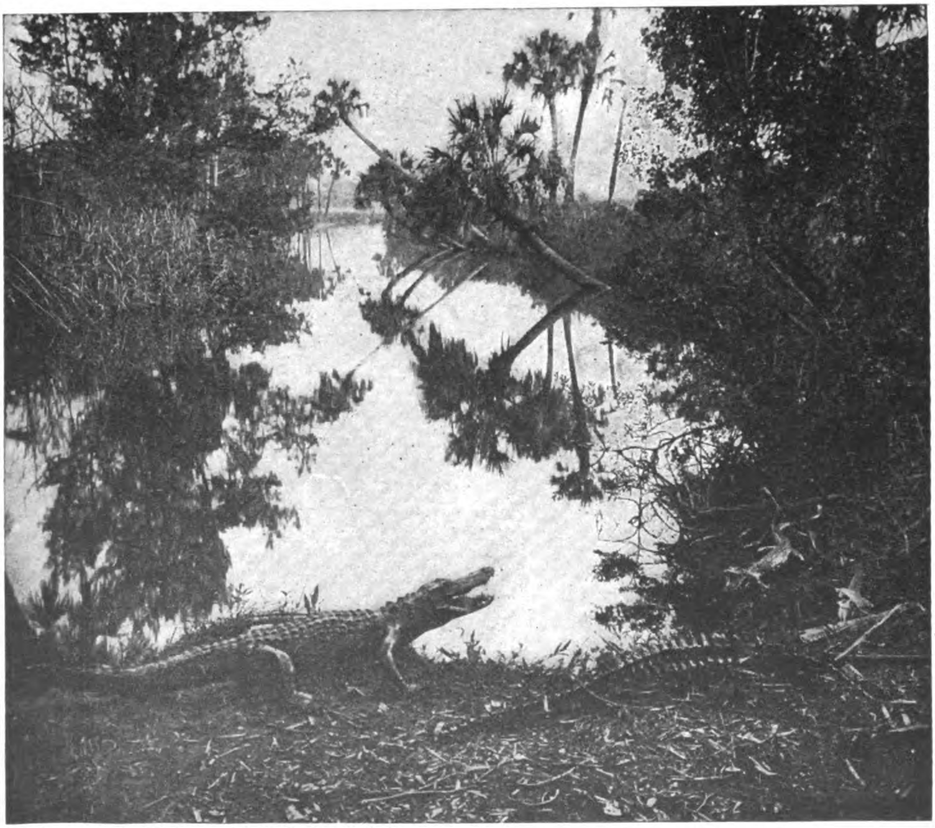
DESERT AND SWAMP IN THE UNITED STATES



Compare these bare mountains of Arizona with the wooded range on another page. So little water falls that only shrubs grow. The men have come to get water from the hole or " pocket" in the rock.



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Much of Southern Florida is a great swamp called the Everglades, which has never been entirely explored. Snakes, alligators and other unpleasant things are found.

THE UNITED STATES AS IT WAS MANY, MANY YEARS AGO

Such is the United States to-day. But it was not always like this. Millions and millions of years ago, water covered the whole region. Then the crust of the earth wrinkled and folded as you may read in the CHILD'S BOOK OF THE EARTH and two chains of islands appeared. These were the highest peaks of mountain ranges in the east and in the west. The lower parts of the mountains were still covered with water and all the central part of our country was an open sea. These were not the present mountains, as they are much younger, while the old mountains have been worn away. As the years went on, the land connecting the islands in each group was raised and finally the land in the north central part of our country was raised, but what is now the Gulf of Mexico covered the southern part up to where the Ohio River now joins the Mississippi, and further west extended into Canada.

The gulf finally moved southward. One great cause was the great quantity of sand and mud which the rivers carried down and the river is still doing this. It builds its delta out into the gulf a little farther each year. Life had appeared on the earth and for thousands of years plants grew and died until their decay made beds of vegetable matter many feet thick. The climate was not the same then as it is now. These beds of vegetable matter which are now coal show that the climate of Pennsylvania was once hotter and wetter than it now is in Florida or Louisiana. Another article in this volume tells you all about this and shows what kind of plants they were.

HOW THE COAL FIELDS WERE MADE LONG AGO

But the surface of the land changed and these beds of dead trees and ferns sank into the sea or into the great inland lakes, and were covered with mud many feet thick. Again they were raised and in this mud the same sort of plants again grew and decayed, and the mud was buried many feet under the black mud. Hundreds of years later they were again below the level of the water. In some parts of the country this went on for thousands and thousands of years and the layers of vegetation because of the great weight and heat became coal and the layers of sand and mud became rock. In some parts of our country there are many beds of coal one above the other with layers of rock between them.

The land is still changing to-day. The sea tears away some coasts and builds up others. The rivers cut away their banks, and hills and mountains are being worn away. But other changes more important than these are also taking place. Men who study such things tell us that the coast of New Jersey is sinking about two feet in a hundred years, and that some day the land where towns and farms now stand will be under the sea. The land in Canada toward Hudson Bay is rising, and some day, hundreds of years from now, the water in the Great Lakes will find its way into the Mississippi instead of the St. Lawrence, leaving Montreal and Quebec inland cities.

VOLCANOES ONCE WERE COMMON IN THE WEST

The mountains raised above the sea began at once to wear away because of the action of water and air, heat and cold. Wise men tell us that some parts of our eastern mountains were once at least five miles higher than they are now. The western mountains are younger and have not worn away so much. Some of these western mountains are still growing. In the west too are many mountain peaks which are dead volcanoes. The states of Washington, Oregon, Idaho and parts of California and Nevada were once almost entirely covered by the lava from these volcanoes. Mt. Hood in Oregon and Mt. Shasta in California are fine examples of dead volcanoes. As the lava decays it sometimes makes a very fertile soil and this is one of the reasons why Washington and Oregon grow such wonderful crops.

SOME ANIMALS WHICH ONCE LIVED IN AMERICA

Queer animals lived in the warm climate. Some were larger than any animals now alive. Another article in this volume tells you about them. There were flying lizards, and lizards that walked. Much later there were elephants larger than any now living, great rhinoceroses, camels, and fierce tigers with long teeth roamed the country. Still later the mammoth and the mastodon, which are described in another place, towered above the other animals. A skeleton of a mastodon found near New York, showed that the animal had sunk in a swamp many thousands of years ago. In his mouth were some twigs which he was chewing when the ground gave way beneath him. There were also huge buffalo with horns ten feet from tip to tip. If you are ever in New York, go to the Museum of Natural History and look at the skeleton of the Brontosaurus, a great creature like a lizard with a long neck and tail, which could reach the tops of tall trees.

THE VERY COLD TIME WHEN ICE COVERED THE LAND

Thousands and thousands of years passed and the climate again changed. Once it had been much warmer than it is now. It became much colder. The United States was larger than it is now, as much that is now under sea was then high above the water. All the islands around New York City were joined to the mainland and the Hudson emptied into the sea at a place now about eighty miles out in the ocean. At the bottom of the ocean its bed has been followed out. The climate became so cold that a great ice sheet, called a glacier, covered much of the northern part of our country. You learn also the causes of glaciers in another part of our book and so we shall tell only a little of what this one did. This ice sheet was more than a mile thick in some places and covered all of New England and New York, except a little corner, much of New Jersey and Pennsylvania and in the Mississippi Valley came down almost to the Ohio River. In the western part of the United States it did not go down so far. This glacier moved slowly, scooping off the soil, gouging out rock, cutting off the tops of mountains and pushing before it great heaps of earth and gravel. These heaps are called "moraines" and are still to be seen in many parts of the land though they are often covered with trees now.

Some one has said that the glacier was a combination of a huge file, a great plow and a mammoth dump-cart. The scratches and grooves made by the rubbing of great rocks upon each other can be seen all over New England and many of the huge boulders lying in the fields were brought from hill tops hundreds of miles away, and as the ice melted were dropped where they now lie. Perhaps you have seen the Rocking Stone in the Zoological Gardens in Bronx Park, New York City. This is a boulder which has been brought from far away and left so delicately balanced on an old hill top, that a child can move it though it weighs many tons. There are stones very much like it all over the region once covered by this great ice sheet.

HOW THE ICE SHEET MADE THE LAKES WE LIKE SO MUCH

Another effect of this great ice sheet was to make the beautiful lakes in the northern part of our country. If you look at a map you will see that there are very few lakes in the southern part of the country while there are thousands in the north. More than ten thousand lakes or ponds have been counted in the state of Minnesota, alone, and there are thousands more in New England and New York. Nearly all of these are the work of the great glacier which once covered the land. Even the great lakes, Superior, Huron, Michigan, Erie and Ontario, are due to this cause, and so is Long Island Sound.

These lakes were made in three ways. Sometimes the ice sheet dumped great masses of the drift upon the land, leaving hollows and ridges. Water collected in the low places, or sank into the ground to come out again in the form of springs which run down into the pond or lake. Sometimes the glacier, slowly moving down a valley, pushed before it a great mass of clay and gravel. When the ice sheet finally melted the valley was left with a dam across it and behind it the water has collected. Sometimes the great weight of ice and stone scooped out holes in the softer stone over which it passed and these holes have become filled with water and are fed by the streams in the neighborhood.

The course of many streams was changed by the dams built by the great glacier. Since they could not run in the old channels they cut new ones for themselves. Sometimes they ran over hard stones which could not be cut so readily. So the water jumps instead of having a sloping bed. Many of these falls which have helped to make New England such a great region for factories, mills and shops are where they are because the course of the river was changed by the glacier. Even Niagara Falls, one of the great wonders of the world, exists because of this fact.

THE ICE SHEET FINALLY MELTS AND GREAT FLOODS COME

All the changes made by the fact that so much of our country was once covered by this great moving covering of ice, can not be told here. Many large books would be required to tell you even a small part of them. We do not know how long the ice sheet lasted. It must have been thousands of years, during which time it sometimes advanced, sometimes stood still, then advanced again and sometimes drew back, as the ice melted faster than the newer ice was supplied from behind. Finally the climate again changed, the land was lowered and the ice melted away. Then the land was raised again until the continent became very much as it is to-day. All of this happened a long time ago as men count time. It has been at least 5000 years, probably as much as 10,000, since the ice sheet disappeared, but as the wise men who study rocks and mountains count time it is only a little while. Geologists, as such men are called, count time by centuries instead of by days as we do.

The change of climate which produced the ice sheet, put an end to many of the queer animals whose bones are yet found sometimes. Others could no longer find the food they liked and died. All life depends chiefly upon food supply. This is a fact to be kept in mind. Many animals, some very much like those to be found in Europe, lived in the forests or on the plains. But on the other hand many animals now common do not belong to the United States but were brought from Europe by the first explorers and settlers.

ANIMALS FOUND IN AMERICA UNKNOWN IN EUROPE

The bison or American Buffalo was one of the most important animals belonging to America. It chiefly lived on the western side of the Mississippi River, though a few were found by the white men east of the Alleghany Mountains. Perhaps you have seen these animals in a zoological garden though they are not common. Once there were hundreds and thousands of them and they began to grow scarce in the west less than fifty years ago. The turkey is a fowl which was unknown in Europe until brought from America. Some of the plants were strange also. Tobacco was unknown to the old world until America was discovered though it is now used as much in Europe as it is in America. The tomato and the potato are also American plants, while the Indian corn and pumpkins were also unknown to the old world.

America, however, did not have any of our common domestic animals, except the dog. The wild horses which only a few years ago were common on the western plains came from the Spanish horses which escaped from their owners and ran wild. Our domestic cattle were also brought over and the same is true of pigs and chickens. Though there is a wild sheep among the Rocky Mountains, the sheep from which we get our clothes and our food were brought over by the white men.

MAN APPEARS IN AMERICA

We do not know when men first came to America or where they came from. It was before the ice sheet left, but men who have studied the matter do not agree how long. Possibly they came over from Asia through Alaska and then down until they spread over North and South America. Perhaps

Alaska was then joined to Asia and they came over the land. Perhaps they used rude boats made of skins, or of trees hollowed out. Some men believe that Europe and America were once united by a narrow ridge of land, which could be crossed. We know that the first white men led by Leif, the son of Eric, who came over from Greenland about the year 1000 found red men in possession of the country, and the description of their life and habits is very like that of the explorers who came five hundred years afterwards.

The story of the Norse explorers under Leif had been lost, and as Columbus thought he had reached Asia, he called the natives Indians, and by that name they are generally known today. Some writers, however, have made a new word from parts of the two words American Indian and call them "Amerinds." This is a very good name but it has not come into common use, for when people have been using a name for hundreds of years it is difficult to change.

Now what were the Indians like? All had reddish or cinnamon coloured skin, high cheek bones, black eyes, and straight black hair which the women wore long. The men shaved all of their heads except one lock called a scalp lock to which they sometimes tied feathers. Few had any beard at all though some men had a few hairs which were often pulled out by the roots. In all other ways different tribes were often much unlike. Some were tall and slender while others were short. Some were gentle and peaceable but others were fierce and warlike; some were trustworthy, others were deceitful, some had learned a good deal about farming and building, while others seemed little wiser than beasts.

The lowest class lived west of the Rocky Mountains. They lived almost entirely by hunting and fishing and planted little or no land. They knew how to make baskets, but did not make pots, and lived in tents called wigwams made of skins sewed together, which they moved very often. The fierce Apaches have not changed their habits much to the present day.

THE INDIANS WHO WERE PARTLY CIVILIZED

South of them, in what is now New Mexico and Arizona, were Indians of a much higher class. They are usually called Pueblo Indians, because they lived in a sort of fort built of brick or stone and called a pueblo. These pueblos were built like great apartment houses and sometimes held several hundred families. Some of them lived close to the Apache Indians, whom they feared very much, and so they often built their houses on the side of a cliff so that they could be reached only by ladders. They cultivated fields of corn and brought water in ditches from the hills to make it grow. They made baskets so closely woven that they would almost hold water, wove good cloth, and made jars and pots which were strong enough to stand great heat. They built temples in honour of their gods, and some of the tribes used bronze tools and weapons, though stone was more common. The chief tribes now in the United States are the Moquis and the Zuñis, but they are few compared with their former numbers. In the picture you can see the ruins of a town built against and in a cliff. This could be reached only by ladders which they would pull up after them.

THE INDIANS OF THE EAST AND THEIR FOOD

East of the Rocky Mountains the Indians were between the two classes in civilization, but they were not all alike, for some tribes had learned more than others. They got most of their food by hunting and fishing but they got some of it from the soil. They had learned how to kill the trees by cutting off a ring of bark around the trunks or else they burned them down. They scratched the ground among the dead trees or the stumps with a stone hoe, or with a flat bone of a deer or a buffalo, or with a stick sharpened in the fire. Then they planted corn and pumpkins, or squashes and sometimes beans, sunflowers and tobacco. Of course the crop was small with such poor tools, as the ground could not be broken up so that the roots could get food enough from the soil. We are told that the Indians of Massachusetts had learned that they could get larger crops if they put a dead fish or two in the hole where they planted the corn, but not many tribes seemed to have known this.

The corn and the sunflower seeds were pounded between two stones. Sometimes they found a hard stone which already had a hole worn part of the way through it by water and used it to hold the corn while the women pounded with a smaller stone. They mixed the coarse meal with water and baked the cake in the ashes. When they were making a journey they parched the corn and then pounded it up. In this way they could have something to eat, without lighting a fire. You see the smoke of a fire might have shown their enemies where they were and have been a cause of great danger.

They made pots of clay, but as they could not make them strong enough to stand the fire, they often cooked their food by heating stones red hot and then putting them into the water. Sometimes they dug a hole in the ground and lined it with smooth stones. Then they built a fire in the hole until the stones were very hot. The ashes and coals were then cleaned out and shellfish, green corn and game were put into the hole and covered with grass or seaweed. If you live on the seashore perhaps you have helped in a clambake, prepared in the same way. Things cooked in this way are so good that one would almost like to turn Indian. Sometimes they cooked meat by hanging it before a fire until it was done, or by broiling it on the coals.

The eastern Indians did not understand the use of metals when the white men came, except that some tribes wore copper ornaments. Their weapons and tools were all made of stone. Some of the arrowheads are very beautiful and some of their axes were made of highly polished stone. You can see some of them in any museum and in many parts of our country they are sometimes ploughed up by the farmers or are found when digging the foundations for houses. The heads were fastened to the arrows by the tough sinews of the deer or other animals and they also used these sinews to sew skins together. For needles they used small sharp bones. The Indians wore very little clothing, which was generally made of deerskins. All wore shoes called moccasins made of soft skins which made no noise as they moved through the woods. When they went to war they painted their bodies and faces to frighten the enemy.

So far as we can judge the Indians made little progress during the thousands of years they had lived in America. One great reason for this was the fact which was told above, that our common domestic animals were not found in America. Without horses, cows, sheep, pigs and chickens it was hard to cultivate the soil or to get enough animal food. Another was that they did not know how to get metals from the earth. Stones and flat bones are not good tools.

THE EASTERN INDIANS LIVED IN HOUSES INSTEAD OF TENTS

Many of the eastern Indians lived in houses made of bark or of branches of trees woven together and covered with skins or clay. Sometimes they lived in the same houses for years, but often they left them when the summer came on, and the game moved away. Often several families lived in one house, which was then arranged like a stable and each family occupied a stall. All these families were supposed to be related, but they did not count themselves related on the father's side but on the mother's. That is, all living in the house said that they were descended from the same woman. Those who were related made up a clan and the clan was known by the name of an animal, such as the Bear or the Wolf or the Turtle. They painted pictures of such an animal, or made an image of wood or stone and called it a Totem. The picture of this animal was often painted on the breasts of men so that it would not come off. A large clan would live in several houses.

A number of clans made a tribe, which was sometimes small and sometimes large. From the old men in every clan, a ruler called a "Sachem" was elected, but his son did not succeed him. The sachems from the clans met together, made rules for the tribe and punished those who broke them. Each clan elected a war chief who led them in battle. Some tribes also elected a head war chief. Generally each tribe was jealous of all other tribes and was always at war with them.

THE INDIAN IDEAS OF RELIGION AND OF SICKNESS

The religion of these Indians was curious. They worshipped their dead ancestors, the Sun, the Winds and the Lightning. Since the lightning in the sky looked something like a moving snake, they respected the snake and many tribes would not kill one. They believed in a Great Spirit, but they thought also that every man, every hill, tree, lake, and animal also had a spirit. Some of these were good and some were bad. Some would help man and some would hurt him. A man was sick because an evil spirit had entered his body. In every tribe were "medicine men" who were supposed to have power over bad spirits. So they would go into the house or wigwam where the sick man lay, and shout, scream, shake a rattle, and say some magic words which might drive out the evil spirit.

If the man or woman died in spite of the medicine man, the body might be placed high in a tree, where it would be safe. Some tribes built scaffolds and placed the bodies there, while others put their dead into huts or caves. Often they buried them in the ground and heaped a great mound of earth over them. These mounds sometimes covered a great number of bodies. With the body they buried weapons, food, and drink, which they thought would be of use in the next world. With a little child a dog was often buried, so that it might have help in finding its way in the spirit world.

SQUAWS NOT SLAVES AS YOU HAVE BEEN TOLD

You have perhaps been told that the Indian woman, who was called a squaw, was the slave of her husband. This is not true. She had her work and he had his. It was his business to chase the game many miles, and sometimes when game was scarce he might be away for days or even weeks. He fought the bears and other wild beasts and sometimes was dangerously hurt. He made weapons and had to be ready at all times to use them. When the clan or tribe was moving the woman carried most of the baggage, but the man had to be on guard, for an enemy hidden behind a tree might at any time send an arrow toward them. The Indian seldom spoke crossly to his wife and children, and when they were safe from enemies and there was plenty of food played games with them. The young men often played games. The game of lacrosse which you may have seen played was an Indian game which our college boys have borrowed.

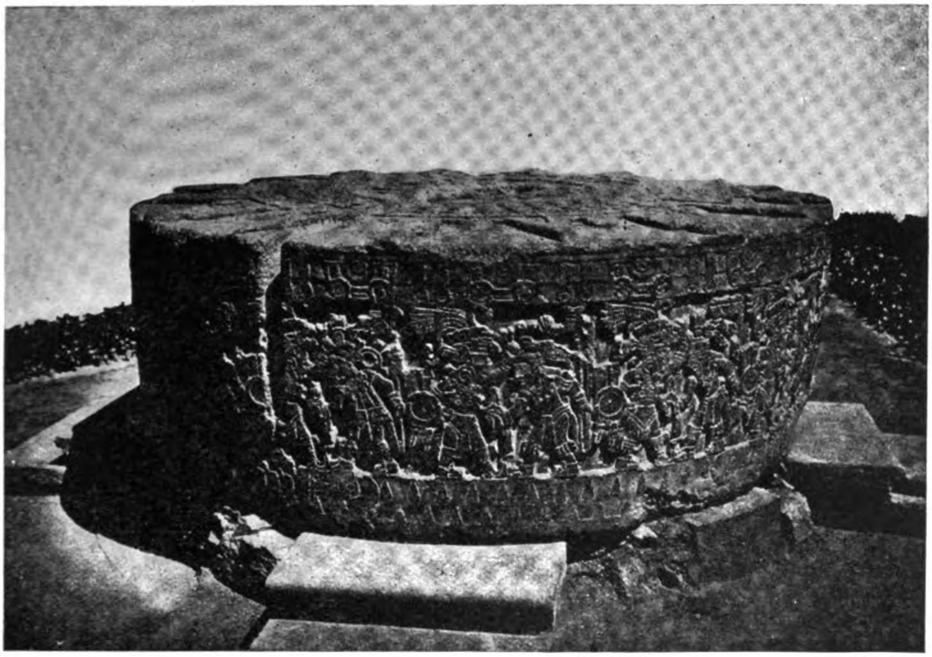
CHILD LIFE; AMONG THE INDIANS

The Indian baby was called a papoose. He had no crib like the one you used, but as his mother was too busy to hold him in her arms he was strapped to a board and hung in a tree. When the mother was travelling she hung him on her back. When he grew larger he helped his mother gather sticks for the fire, or gather berries. He had a little bow and arrows and learned to shoot. He was taught to swim, to run, and to climb. He learned to track rabbits and to set traps for them and other small animals. When he grew larger he was taken on hunting trips, and then to war. But not until he had killed an enemy and taken his scalp was he considered to be really a man.

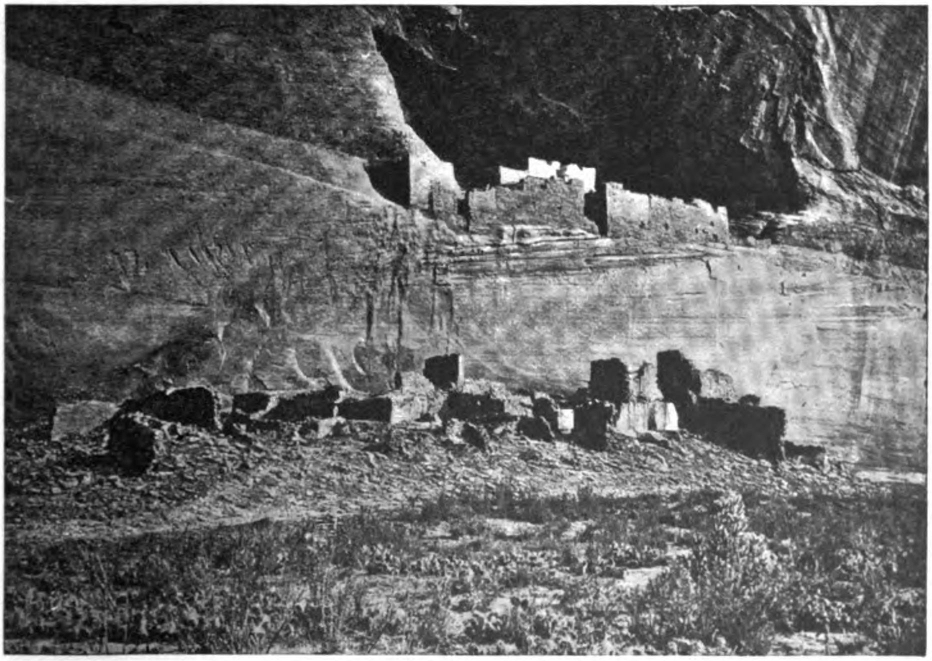
The first years of the little Indian girl were spent in much the same way. But instead of learning how to shoot she learned how to prepare skins for moccasins and to sew tents. She learned how to cook and to cultivate the ground and in some tribes the women wove coarse cloth, and made baskets and pottery. She encouraged the boys and young men to be brave and would not speak to one who seemed to be afraid of anything.

We have spoken several times of the fact that the Indians were almost always at war. This was often because of the

INDIAN SCULPTURE AND BUILDINGS

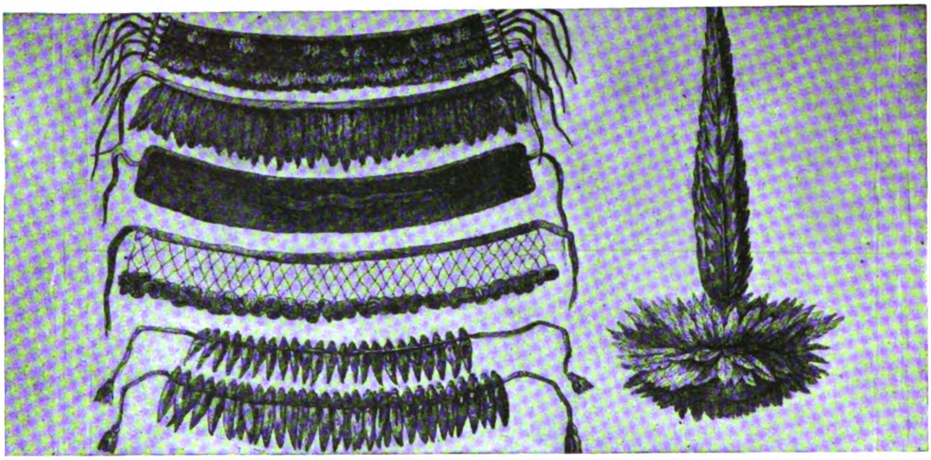


This stone is supposed to be the work of Aztec Indians whom Cortez found in Mexico four hundred years ago. Notice how clearly and accurately the many figures are carved upon its curved surface.

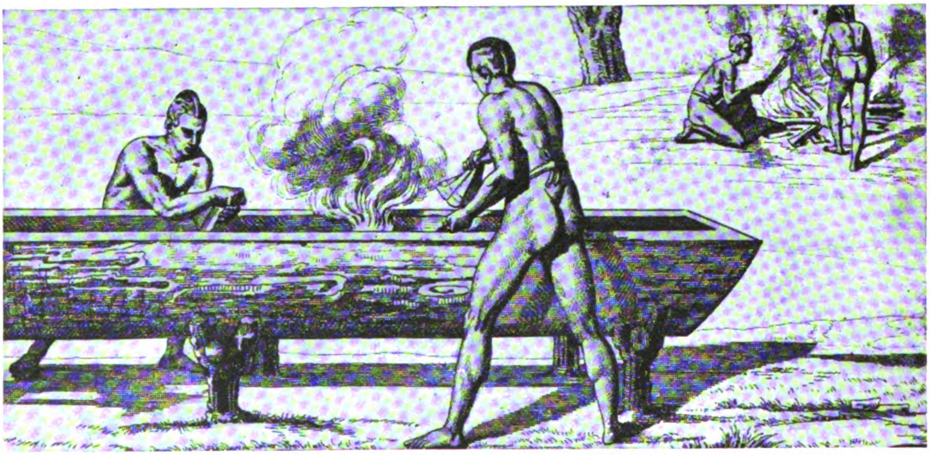


Here are the ruins of an Indian village now seen in the Canon de Chelly in Arizona. Notice the part of the village in shelf of the cliff. If you look closely you can see some pictures drawn upon the face of the cliff. The vegetation in the front of the picture shows how dry and warm the climate is.

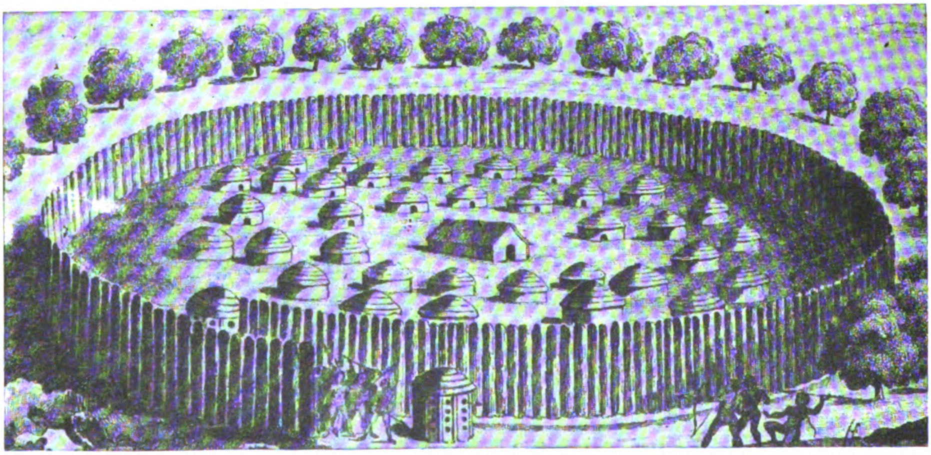
INDIAN PICTURES OVER A CENTURY OLD



Indians used shells strung together for ornament and also for money called wampum.



Here we see Indians burning out the centre of a log to make a rude canoe.



Many Eastern Indians lived in huts covered with bark or clay, and surrounded by a strong fence.

fact that one tribe hunted on the ground that was claimed by another. You think of our country as having been full of Indians. This is not true, for when the white men came there were probably not as many Indians in the whole of the United States as there are now people living in Boston. Men who have studied the subject say that there were not more than half a million in all. That means that there are now nearly two hundred times as many people in the United States as there were four hundred years ago.

Now a people who live chiefly by hunting must have a large territory, for game does not stay in one place like cows or sheep. Sometimes the hunter would go for days without finding anything, or if he did find it, a bow and arrow is not so good a weapon as a gun, and the deer often got away. So in order to get close to it he had to learn to move quietly and to learn to follow tracks. It is not true that the Indians had keener sight than the white men who lived the same kind of life. Some of the white scouts and hunters as we shall learn hereafter were quite as skilful as the Indians.

TORTURE OF CAPTIVES TAKEN IN WAR. THE CASE OF JOHN LAWSON

When captives were taken, sometimes they were killed on the spot, but generally they were taken back to the village. Women and children were spared to help the squaws with their work. Sometimes young men and boys were adopted into the tribe to take the place of warriors who had fallen in battle. More were tortured in various ways. Sometimes he was fastened against a tree and the boys and young men threw tomahawks at him trying to see how near they could come without hitting him, but the captive's pride kept him still, for to dodge would have been considered cowardly. Finally he was often fastened to a stake, wood was piled around his feet and set on fire. As the flames grew hotter, he sang his death song telling how brave he and his tribe had always been. When the Indians captured white men they tortured them in the same way.

In the early days of North Carolina they captured a surveyor named John Lawson, stuck his body full of pine splinters which burn very fast and then set them on fire.

You will find the names of many Indian tribes as you read United States history but I shall give only a few of them now. The Indians east of the Rocky Mountains were divided into three great stocks, called the Algonquins, the Iroquois, and the Maskoki. The last lived in the South and the principal tribes were the Chickasaws, Choctaws, Creeks and Seminoles. Their descendants now live in Oklahoma. The Iroquois lived in New York and the neighbouring states, and the principal tribes were the Five Nations, the Eries and the Hurons. The Cherokees and the Tuscaroras who lived in North Carolina and Tennessee were also Iroquois. The Algonquins lived in New England, New Jersey, Maryland, Virginia and in the region further west.

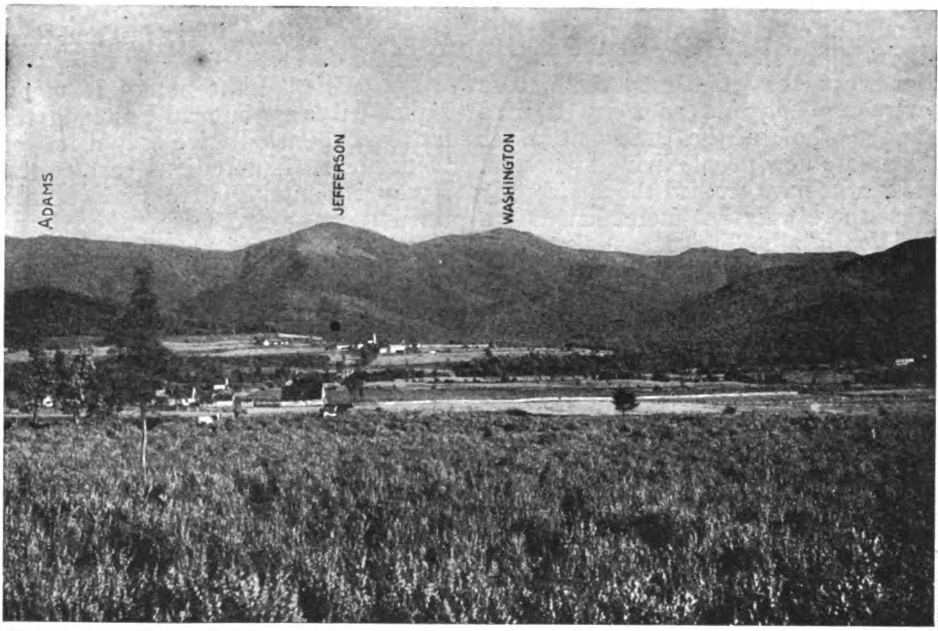
THE FIVE NATIONS THE MOST POWERFUL OF THE EASTERN INDIANS

Of all these the Five Nations were the most advanced. The tribes were known as the Senecas, the Cayugas, the Onondagas, the Oneidas and the Mohawks. Later when the Tuscaroras in North Carolina were badly defeated by the whites, that tribe moved to New York and joined the Five Nations, which were afterward known as the Six Nations. These tribes had settled homes from which they did not move and cultivated more ground than any other Indians. They were also fierce warriors. Some of them still live in New York State.

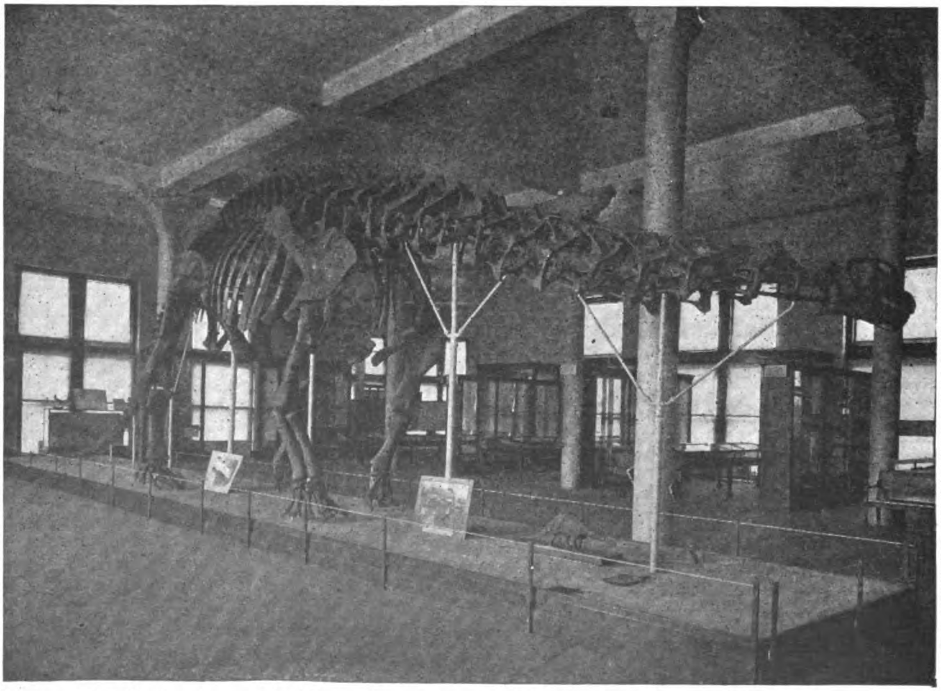
In other chapters of our story of the United States we shall read how the Indians and the white men met and shall see that the white men often treated the Indians harshly, and how the Indians paid them back. Some of the Indians boasted that they never forgot a kindness and never forgave an injury. We shall see how the white men pushed the Indians back until now they have only a small part of the country, though there are now almost as many Indians in the United States as there were four hundred years ago.

Continued on page 257.

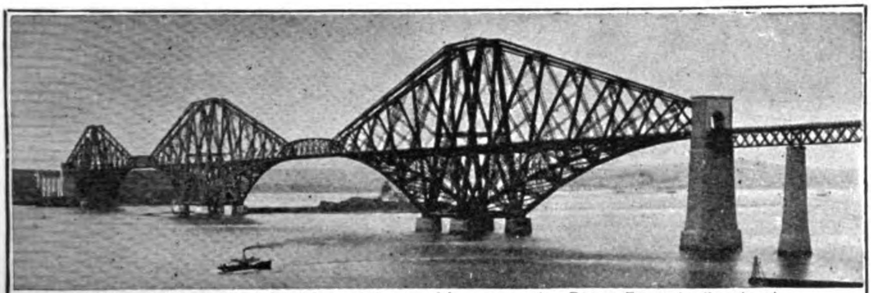
MOUNTAINS AND MONSTERS OF AMERICA



These are the White Mountains in New Hampshire, known as the Presidential Range. Mt. Washington is the highest, though it does not look so, because it is farther away than Mt. Jefferson.



This creature lived millions and millions of years ago in the Western United States. When the Brontosaurus died his body fell into the clay, and only a few years ago his bones were found, and now stand as shown in the Museum of Natural History in New York City. The length of the skeleton is 66 feet, 8 inches, and its height 15 feet, 2 inches. It is estimated that when alive he weighed about 38 tons or 76 thousand pounds.



The most wonderful bridge in the world, across the River Forth in Scotland

FOOTPATHS IN THE AIR

No one can say who built the first bridge. Nature herself would no doubt be man's first teacher. Man would find a path across a chasm by clinging to a twisted vine; or he would see a ready-made bridge consisting of a fallen tree-trunk across a stream. Those were the first bridges, and they were the sort which would have to be made for hundreds of years.

One day a genius arose, who dumped high heaps of stone in a line across a stream, and on the top of these placed slabs of slate or stone or fallen trees. Then, a long, long while afterwards, came bigger, real bridges. The Romans were the first to learn how to make these. They built splendid bridges on arches, some of which exist to-day.

Men had a long time to wait before they got good bridges in England. The twelfth century had almost ended when the first great London Bridge was built. There were wooden houses and shops on it, but these were always catching fire and damaging the bridge, and they were all pulled down before the bridge was destroyed.

A great reform was made in bridge-building by John Rennie. It had been customary to make the arches very high, so that the roadway sloped very sharply up on one side, and very sharply down on the other. But John Rennie made his arches, not like the half of a circle, but like the half of an egg, cut lengthwise.

There still exists a famous single-arch bridge of the old type, the famous bridge at Pontypridd, in Glamorganshire. The first bridge there had three arches, but the river washed them away. Then the builder, William Edwards, put up another in its place, but it had only one arch, and soon fell.

Edwards discovered the cause of its fall. There had been too much weight on the supports, and not enough in the centre. By being too light on top, the crown of the bridge was forced up and made to fall. Then he built a third bridge, in which the haunches were lighter and the top heavier. That bridge still stands, after being used for more than 150 years.

When the eighteenth century was drawing to a close, men began to build bridges of cast iron. But engineers soon found that, though cast iron can bear great pressure, it will not bear much *pull*. It cannot be easily crushed by a weight, but it can soon be snapped by weights which pull at the two ends. So they then used wrought iron, which cannot easily be pulled apart. That served until steel came into use in the nineteenth century.

The first great bridge built of wrought iron was the Britannia Bridge, which crosses the Menai Straits in North Wales. The builder was Robert Stephenson, of whom we read elsewhere. He made a huge square tube of iron—iron at the top, iron at the sides, iron at the bottom, and through this tube of iron the trains pass. To increase the strength of the bridge he made the iron at the top and bottom tube-shaped, instead of solid, because it would better stand the pull of the weight.

THE GREAT IRON TUBES IN WHICH THE TRAIN CROSSES THE WATER

These tubes are built on huge columns of masonry, one being founded on an island half-way across the water, and the others on the land at the sides. As ships were constantly passing, it was impossible to put up great scaffolds on which to build up the ironwork. So Stephenson had the two tubes, nearly 500 yards long, built in four sections on shore. When all was ready the big tubes were floated on many boats, and ferried out to the towers.

As the tide went down the boats gradually sank, and the tubes, weighing 5,000 tons each, came to rest in grooves prepared for them in the masonry. Then the boats were drawn away and the enormous masses of iron were hoisted up to the proper height, 100 feet above the water, by great engines.

The finest of all bridges is the great steel cantilever bridge. A cantilever is copied from the oldest of simple bridges. If two trees lean over the water from different sides of a stream we have only to run a plank from the end of one trunk to the end of the other, to make a simple cantilever bridge. That is one way of applying it. The other is to consider the cantilever a bracket. Secured firmly at one end, a bracket will bear a shelf with a heavy weight of books, and the steel cantilevers forming a bridge are merely huge brackets. The best example is the great Forth Bridge.

A GREAT BRIDGE-BUILDER WHO DIED BROKEN-HEARTED

There had been many schemes for bridging the River Forth, and at last the work was begun by Sir Thomas Bouch, who had built the famous Tay Bridge. But suddenly, one dreadful night in the winter of 1879, part of the Tay Bridge was blown down, carrying with it into the river a trainload of people. Everybody in the train was drowned, and the country was horrified. Sir Thomas Bouch died broken-hearted, and the Forth Bridge was designed by Sir John Fowler and Sir Benjamin Baker. They had to cross two swift channels of water. There is an island in the middle, but on each side of it there flows a channel of water deep and swift, and 1,700 feet broad. It was impossible to sink piers in these channels, so the central pier was founded on the island, and two others built nearer the shores.

The cantilevers, of which there are three pairs, carry the bridge across the two wide stretches of water. They are each 1,360 feet long, and the three, stretching out towards each other, leave a space of 350 feet to be covered between the ends of the first and second, and a similar space between the ends of the second and third. Here ordinary steel girders are used. In order that ships may pass under it, the bridge is made 150 feet above high tide, and its top parts are 361 feet above the water.

The cantilever-bridge plan has since been used for many other bridges. One on this plan crosses Niagara at a great height above the water. The cantilever is used in suspension bridges also. Huge columns are erected on land, and from them chains or wire ropes are stretched across the gulf, carrying a roadway.

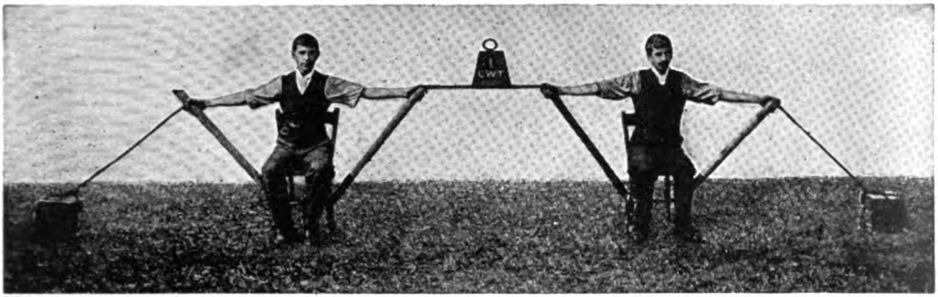
HOW KITES AND ROCKETS ARE USED FOR BUILDING GREAT BRIDGES

The best suspension bridge in England is at Clifton. This is 702 feet across, and 31 feet wide. It is more than 200 feet above the River Avon, and it is said that the first string attached to the rope which pulled across the cable was sent over by a kite.

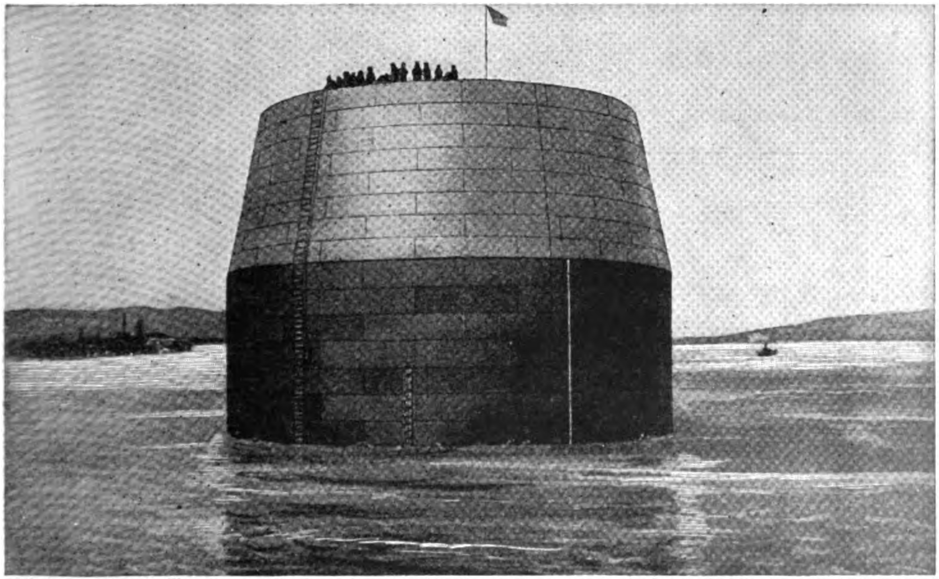
A still stranger way was adopted for starting the great bridge across the River Zambesi, in South Africa. The bridge is the highest in the world—400 feet above the water, and runs from cliff to cliff; so they had to fire a rocket fastened to the end of a cord. The rocket took the cord across, the cord was used for hauling across a wire, and the wire was used to pull over a small cable. On this a truck crossed carrying the main cable of the bridge, which is 200 yards long, and the greatest engineering wonder in South Africa.

The Tower Bridge, in London, is 800 feet long. When a ship is too high to pass under, great machines cause the roadway to open in the middle. The two halves are pulled up, working on enormous hinges, and the ship passes through.

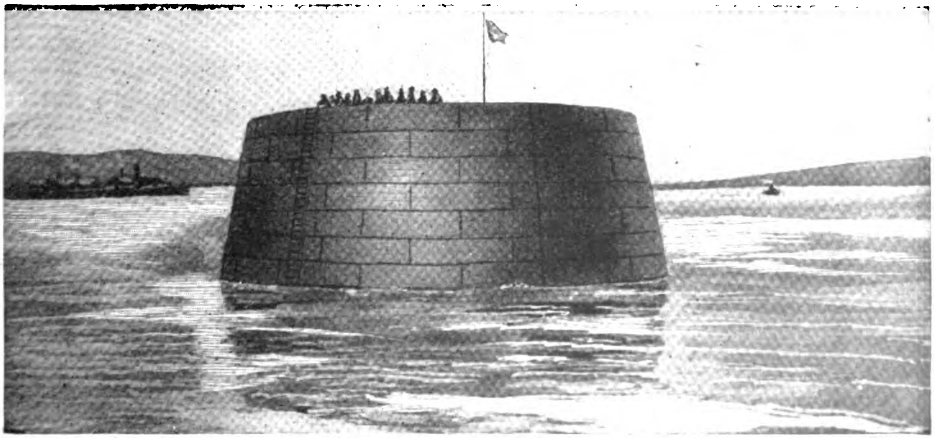
THE BEGINNING OF A GREAT BRIDGE



This shows us how the weight of a bridge is distributed; it illustrates what bridge-builders call the cantilever principle. These two men are sitting on chairs, each holding two sticks. The outside sticks are fastened to weights, and cannot move. The inner sticks are fixed to the chairs, and from their tops another stick is stretched, bearing a weight of 112 pounds. Yet the men feel no weight, and they represent two pairs of cantilevers.

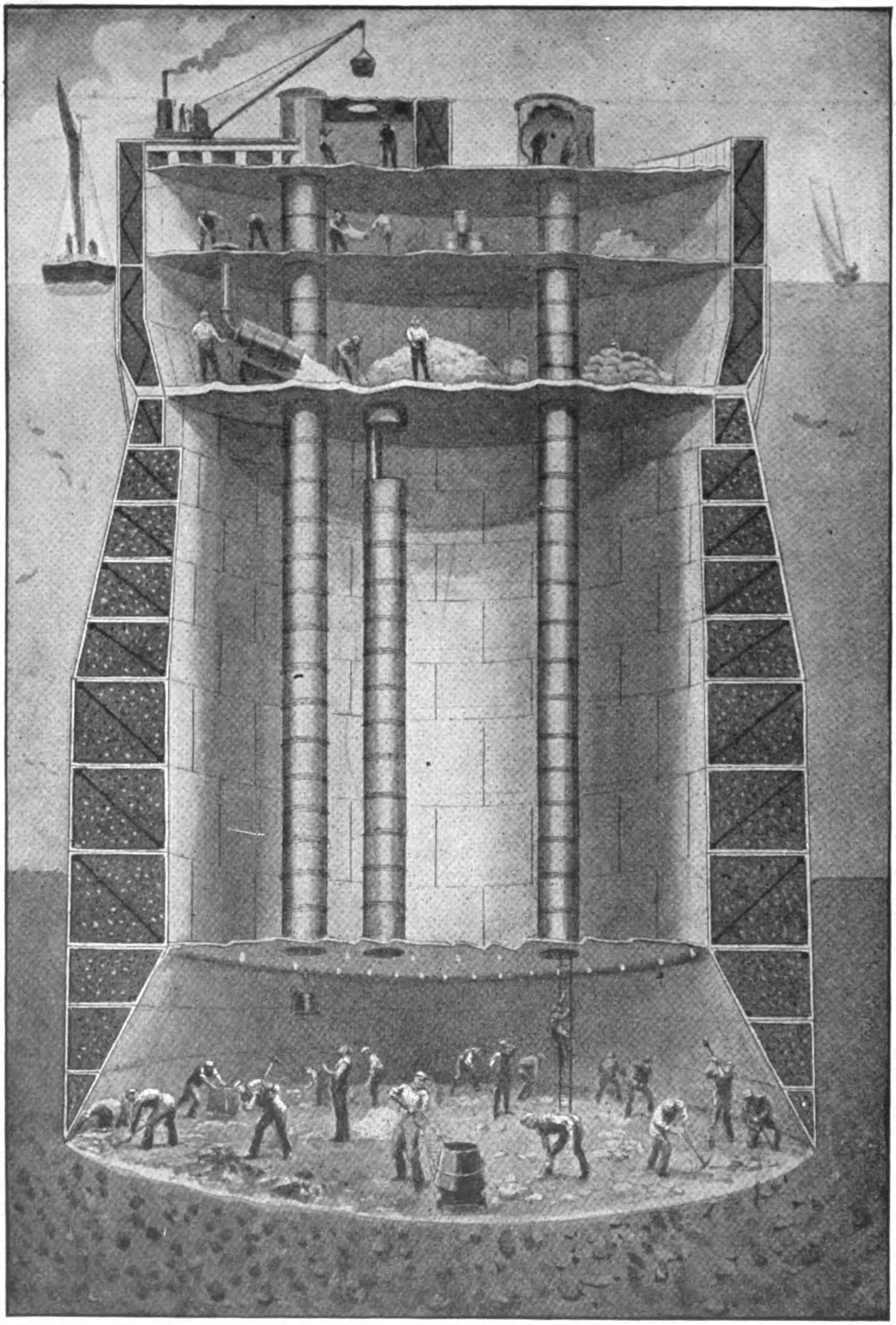


This is a caisson, like a great hollow chamber, inside which men can work to set up the foundations of a bridge. The caisson is here floated into position for the building of the Forth Bridge. The huge steel tubes reach down to the bottom of the water, and men work inside them without danger, as if in a workshop.



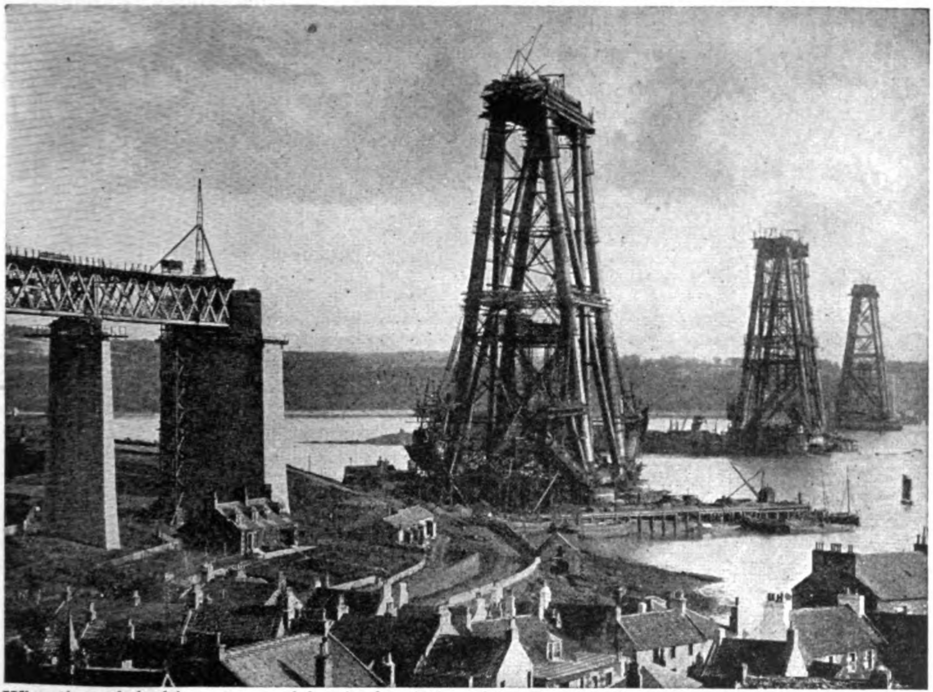
This shows the caisson in position, sinking in the water. It is about 70 feet wide at the bottom. Though open at the top, it has water-tight floors inside, and at the bottom there is a chamber 70 feet wide and 7 feet high, lighted by electric lamps, in which the men, breathing air sent down in tubes, can work safely.

A GREAT WORKSHOP DOWN IN A RIVER

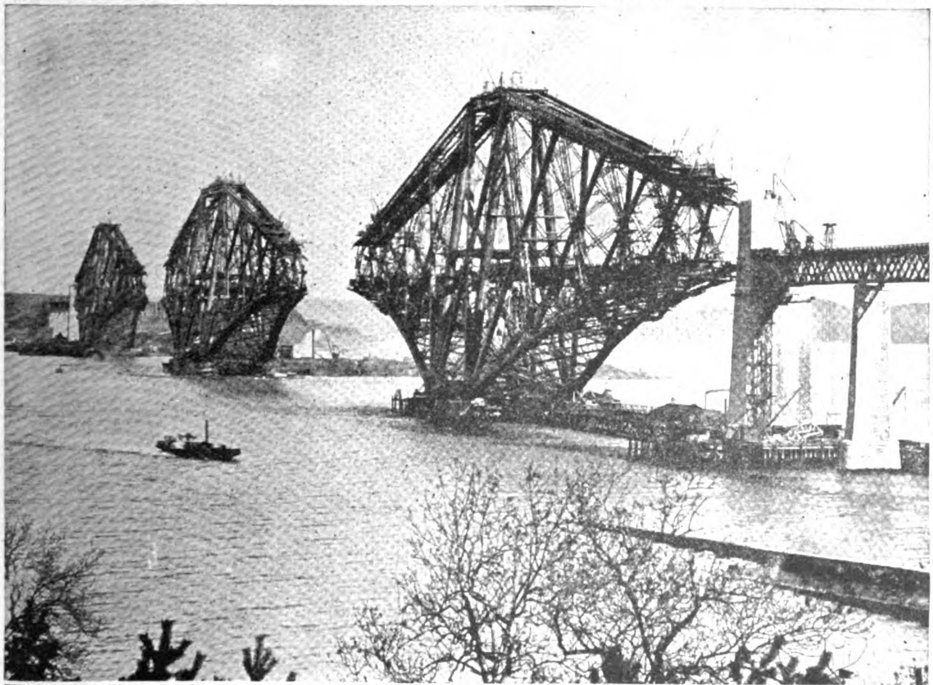


This shows us the inside of the caisson while the men are working in the River Forth. We can see the tubes leading from the top down to the working chamber at the bottom. Inside one tube is a ladder by which the diggers climb up and down. Other men bring down material, and take up the broken rock which has been dug. Another tube brings down air for the men to breathe. If the bed of the river is muddy, the mud is forced away by the compressed air. Water is kept out of the chamber by compressed air, which is made to press with greater force than the water. From top to bottom the caisson is 60 feet deep, and inside it is like engineering works.

THE FORTH BRIDGE PIECE BY PIECE

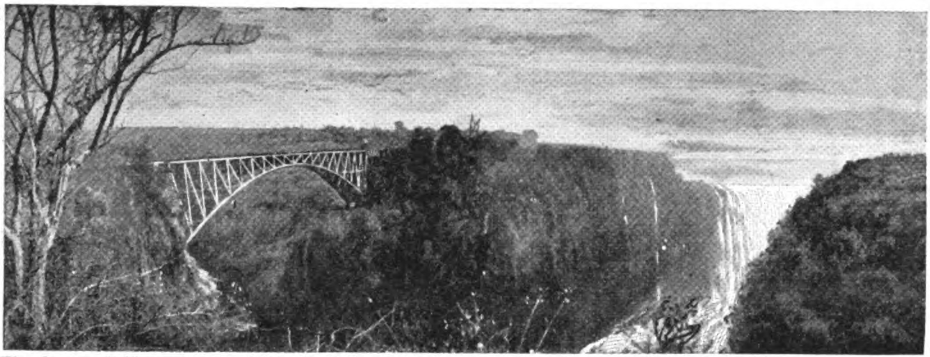


When the rock had been prepared for the foundation of the Forth Bridge, strong masonry was built from the rock below the water up to the top. Then huge pillars of hollow steel, such as we see here, were put up for the cantilevers, and were fastened down to the masonry with enormous steel bolts. They are 343 feet high, but so strong that neither the weight and vibration of great trains nor the force of storms can break them.

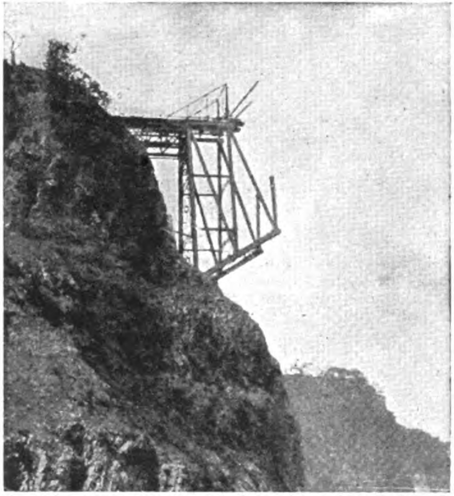


The giant pillars having been made fast, the cantilevers began to grow out from them. Each of these is really a double cantilever. They stand like brackets back to back. Perfectly balanced, they stood firm while the engineers built out into the air from them, as if they were brackets fixed to the walls, bearing heavy shelves.

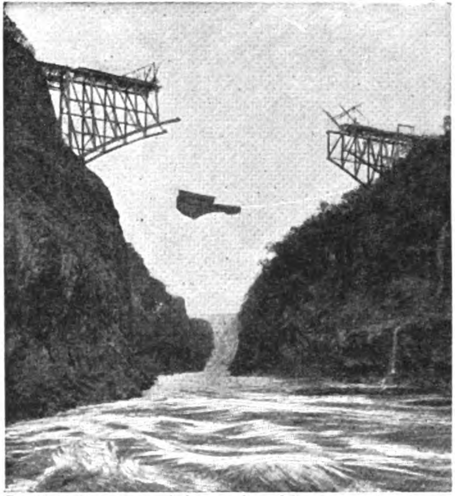
CARRYING A TRAIN ACROSS A CHASM



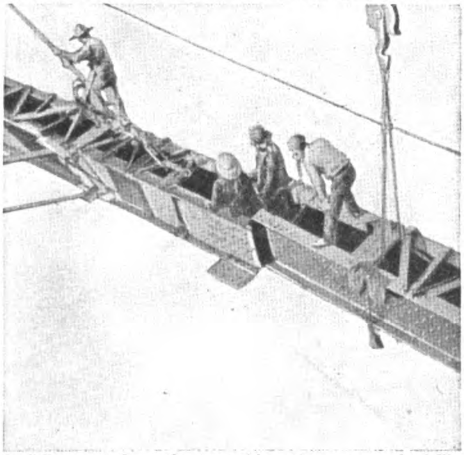
The famous bridge near the Victoria Falls on the Zambesi River, in South Africa, is the highest bridge in the world. The river here suddenly drops into a vast gorge, which winds and twists for a distance of more than fifty miles. The bridge takes the trains across at the most convenient place. It is 400 feet above the water and 600 feet long, and is an important link in the railway that is to connect Egypt with Cape Colony.



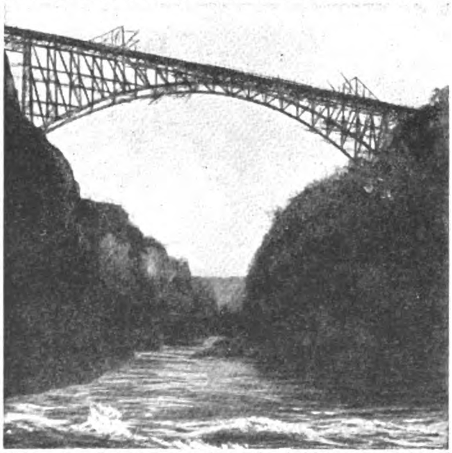
A cable was sent across the chasm by rocket, and work was begun from both sides at once. This picture shows us how the building-out on one side of the gorge began.



So that the men might work safely, a great net was stretched across the chasm. We see it here, under the growing bridge, ready to catch men in case they fall.

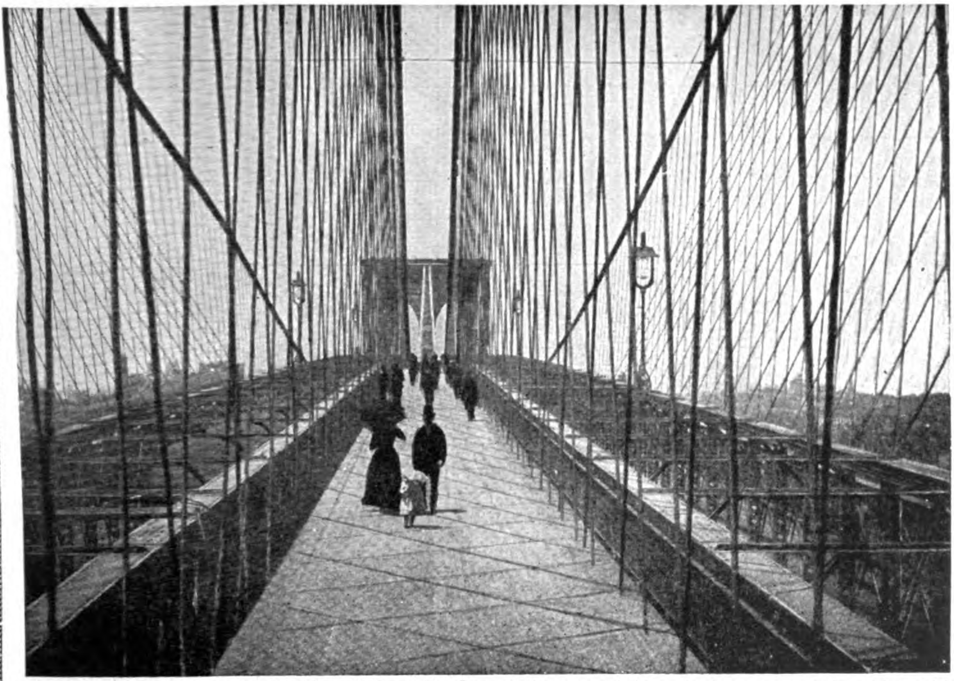


Building out from the two sides, the men worked like clockwork. The two parties met exactly in the centre, and we see them here joining the last two girders.

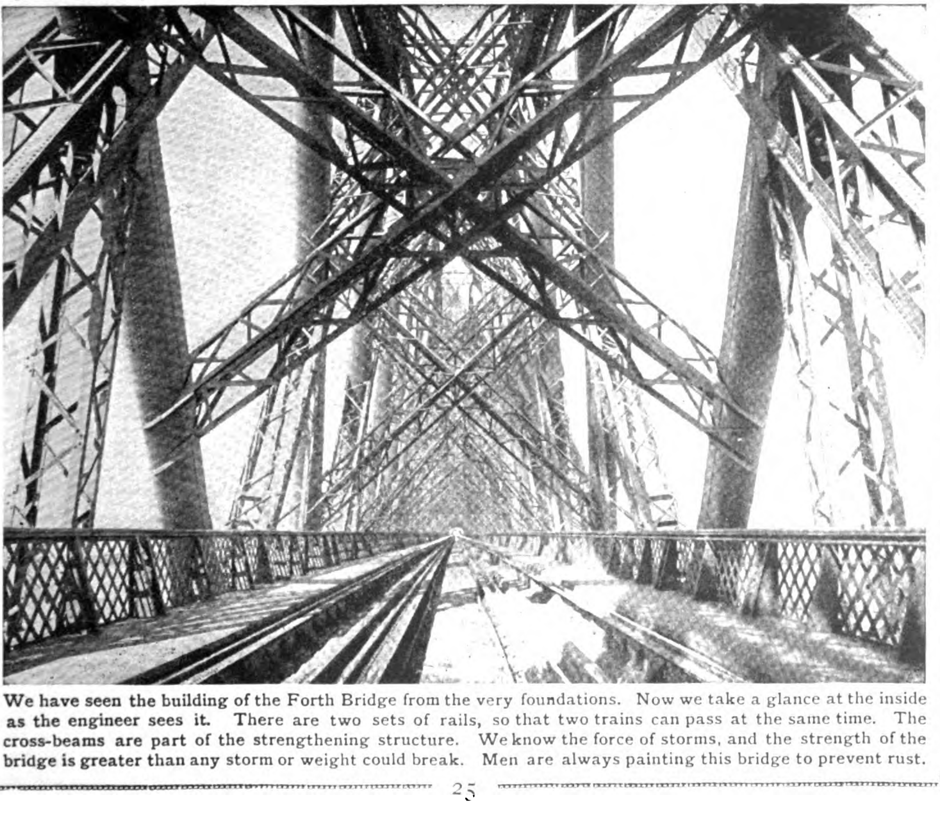


After the finishing touches, the bridge was painted grey. Now, amid the flying spray, it can scarcely be seen, and the glorious scenery has not been spoiled.

INSIDE TWO OF THE GREATEST BRIDGES



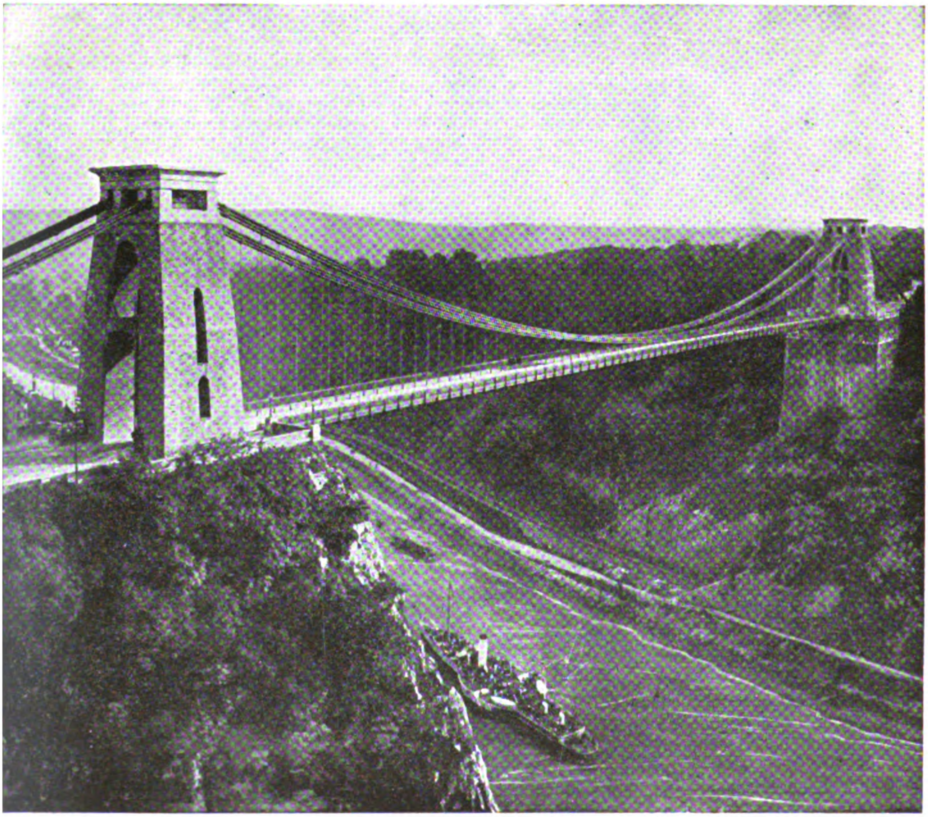
This shows the footway of Brooklyn Bridge, the first of the great bridges built to connect Brooklyn with Manhattan Island (New York City). There are now four of these bridges. All of them are provided with separate roadways for foot passengers, for street cars, elevated trains, and for other vehicles.



We have seen the building of the Forth Bridge from the very foundations. Now we take a glance at the inside as the engineer sees it. There are two sets of rails, so that two trains can pass at the same time. The cross-beams are part of the strengthening structure. We know the force of storms, and the strength of the bridge is greater than any storm or weight could break. Men are always painting this bridge to prevent rust.

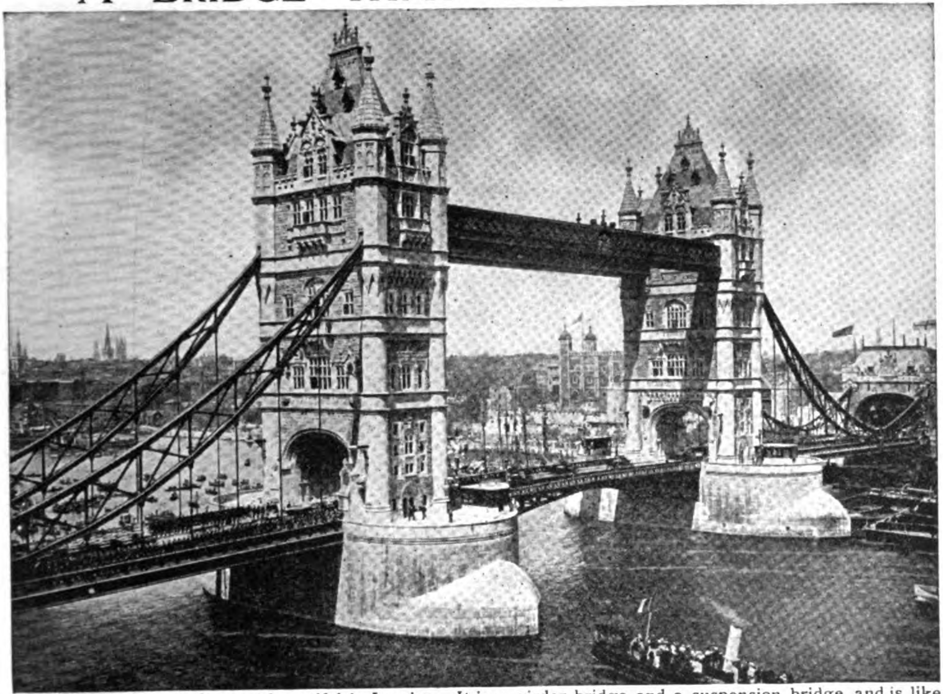
FAMOUS BRIDGES HANGING IN THE AIR

Brooklyn Bridge is one of the biggest suspension bridges in the world. It crosses the East River, to connect Brooklyn with New York. The whole length of the bridge is more than a mile, and its distance across the water is 1,600 feet. Cables pass over the towers, and from these other cables hang down to support the roadway.

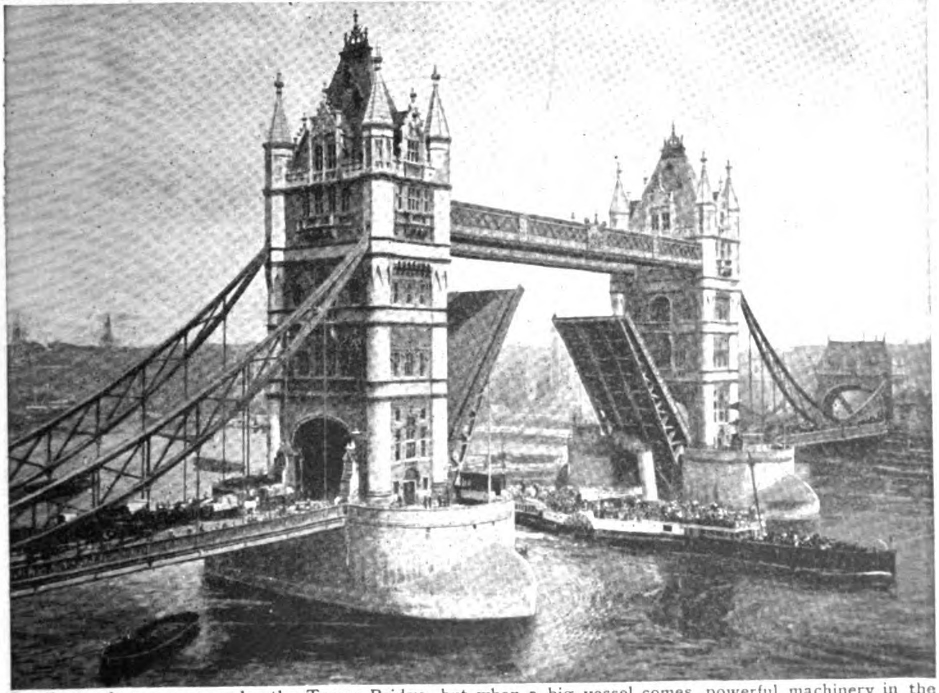


The suspension bridge over the Avon at Clifton is the most famous of its sort in England. Part of the chains used once helped to hold up Hungerford Bridge, London, before that bridge was pulled down to make room for Charing Cross Bridge. Although the roadway of the Clifton Bridge looks level, it is really two feet higher in the middle than at the foot of the two towers. The bridge has a span of 702 feet and connects two counties.

A BRIDGE THAT OPENS IN TWO

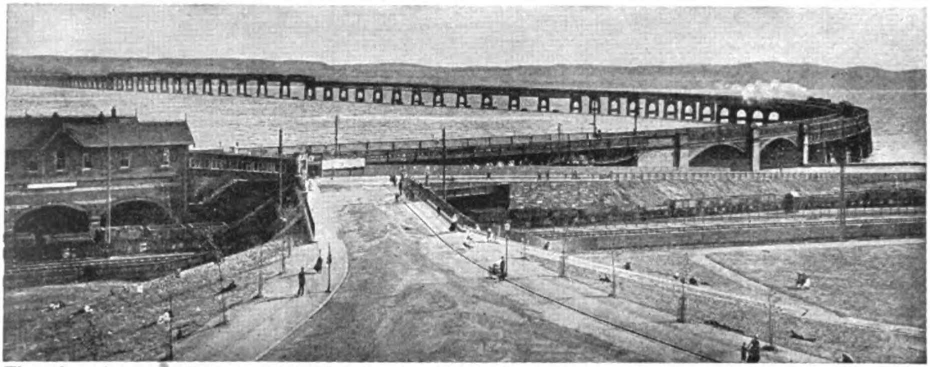


The Tower Bridge is the most beautiful in London. It is a girder bridge and a suspension bridge, and is like the old-fashioned drawbridge which castles and fortresses had, only far stronger, of course. First we see it with the drawbridge down, so that horses and carts and people may pass, while small steamers can go under it.

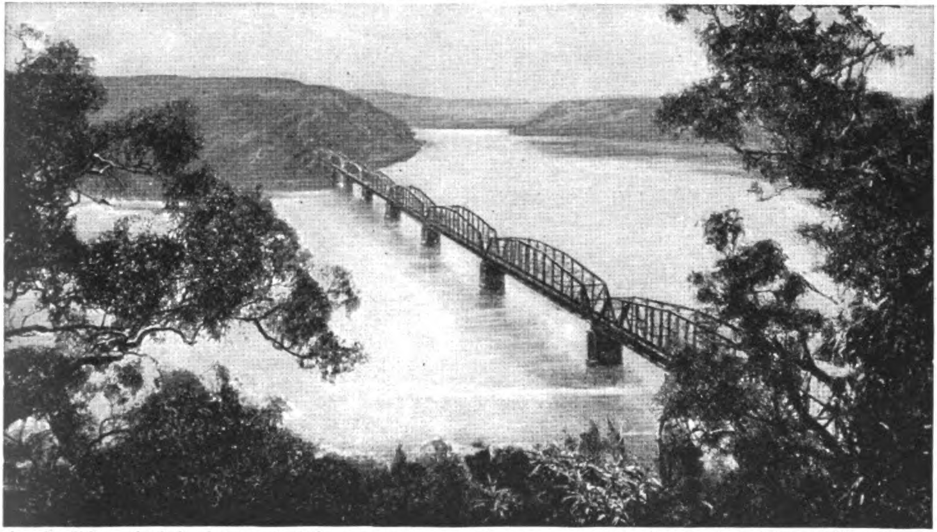


Small vessels can pass under the Tower Bridge, but when a big vessel comes, powerful machinery in the towers of the bridge is set to work, the roadway opens in the middle, and the two ends are pulled up on end. When the vessel has passed, the two halves of the road quietly descend to form one road again, and traffic pours over from both sides of the river. The roadway at the top is always in use, and is for foot-passengers.

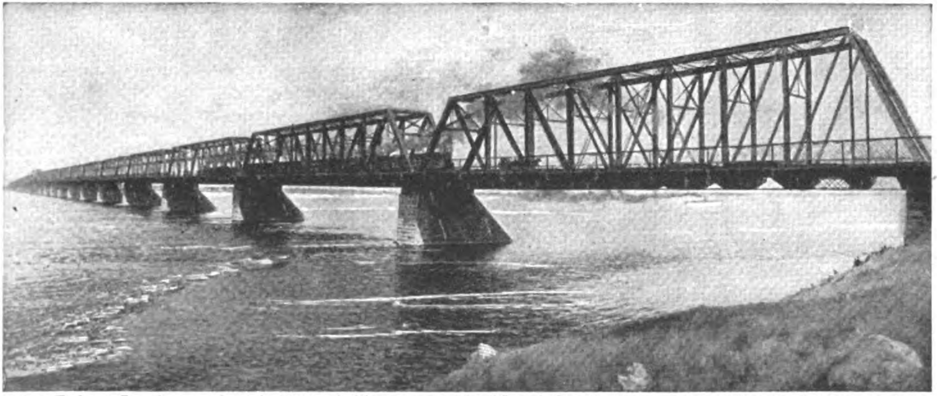
BRIDGES ACROSS THREE GREAT RIVERS



There have been two Tay Bridges at Dundee since 1878. The first was two miles long and 90 feet above the water. It was not a strong bridge, and one stormy night in December, 1879, about 1,000 yards of it were blown down while a train was passing. Ninety people were drowned. The old bridge was pulled down, and this new one was opened in 1887. The Tay carries more water to the sea than any other river in Great Britain.

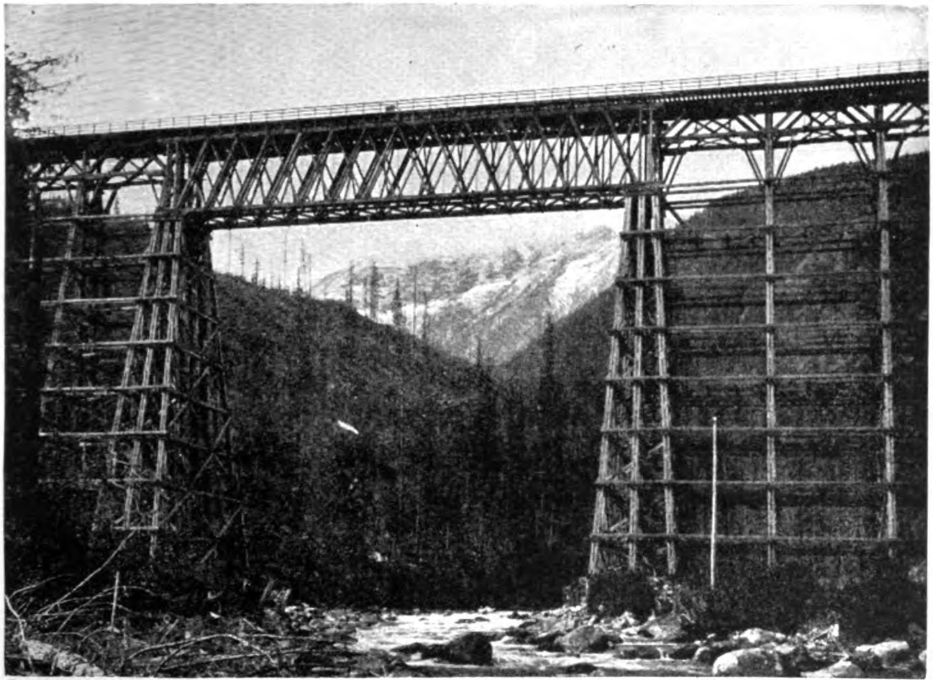


A splendid steel girder bridge, built in seven spans, carries trains over the Hawkesbury River in New South Wales, Australia. It took only three years to build this bridge, which was opened in 1889. Its length is nearly 1,000 yards, and it is of great importance to the big cities. Without it the railway would be practically useless.

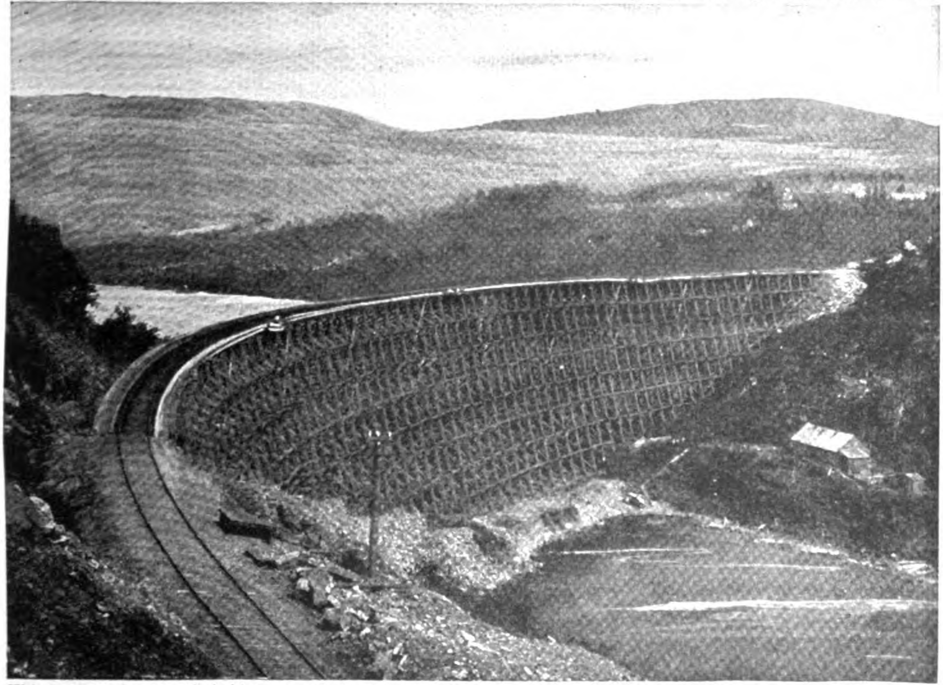


After Robert Stephenson had built the bridge across the Menai Straits the people of Montreal, Canada, built one like it across the St. Lawrence, the great river which carries more water to the sea than any other river **except one in the world. It stood for 35 years. Then, in 1899, they built this splendid new one. It is nearly two miles long, contains 20,000 tons of steel, is four times as strong as the old one, and is the finest bridge in Canada.**

BRIDGES OVER MOUNTAINS AND LAKES



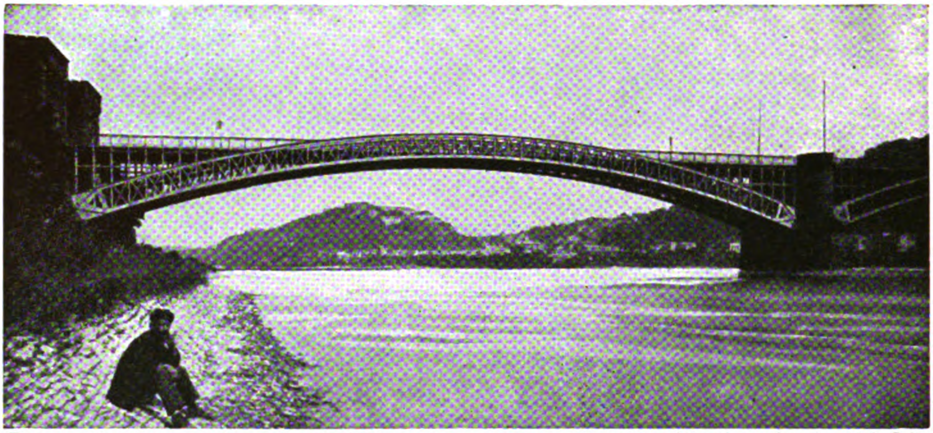
Canada is crossed by the great Canadian Pacific Railway, which, beginning near the shores of the Atlantic Ocean, ends on the other side of the continent, at the Pacific. It passes on its way through wild and rugged country, over deep ravines and swift torrents, and it is only by bridges like this one, which is at Mountain Creek, that the railway is possible. Canada's prosperity depends upon the railway, and the bridges are the chief links.



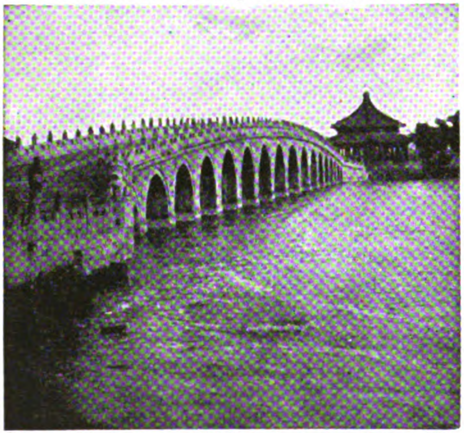
This is a wooden trestle bridge near Lake Superior, in Canada. Such bridges are cheap and serviceable, but sometimes they have caught fire and a train has rushed into the burning timber and the river below.

The photographs in these pages are by Messrs. G. W. Wilson & Co., Wilson Bros., Underwood & Underwood, Valentine, Notman, and the Canadian Pacific Railway Co.

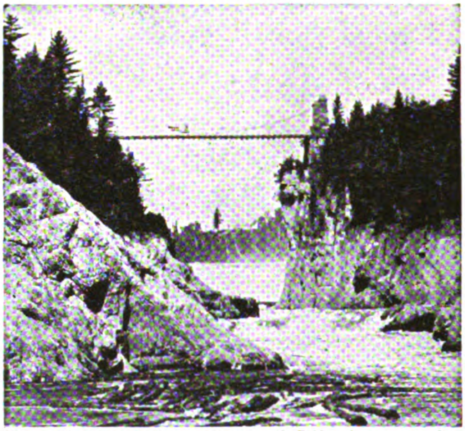
SINGLE SPANS AND MANY SPANS



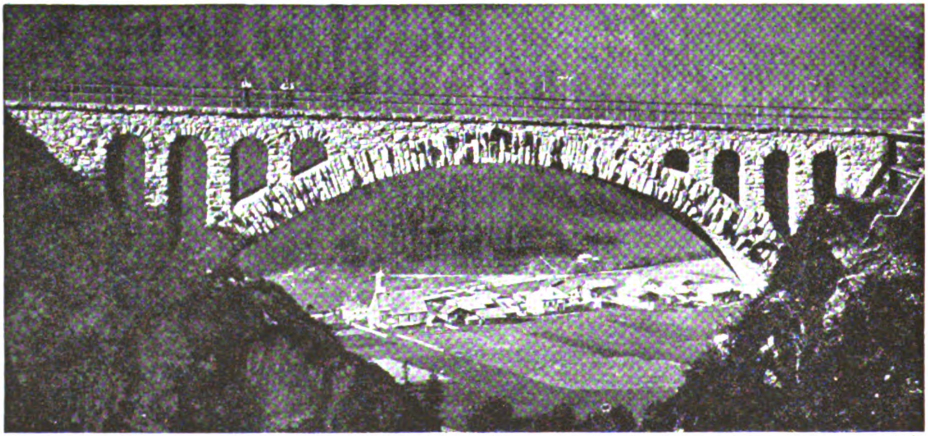
The great bridge across the Rhine at Coblenz, Prussia, shows us the value of the form of arch which John Rennie first adopted. Although we have only one great span here, the roadway is practically flat, not steep as those over the old single-arch bridges were. This is because the arch is shaped like half an egg.



The marble bridge at Pekin is famous and beautiful, but its sixteen arches interfere with traffic in the river, and make the roadway very steep. We can all see the difference between this and Coblenz Bridge.



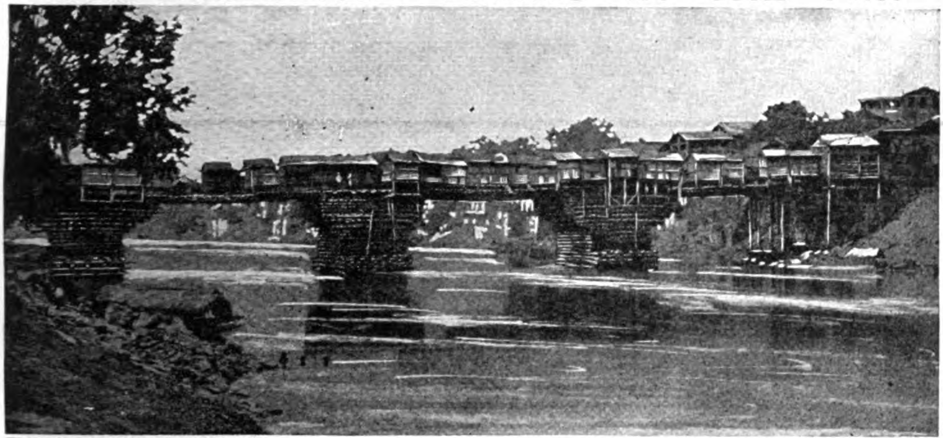
New Brunswick has a copy of Clifton's suspension bridge. It crosses the Grand Falls at a giddy height above the water, and looks, in the distance, like a spider's web. Here we see a vehicle passing over it.



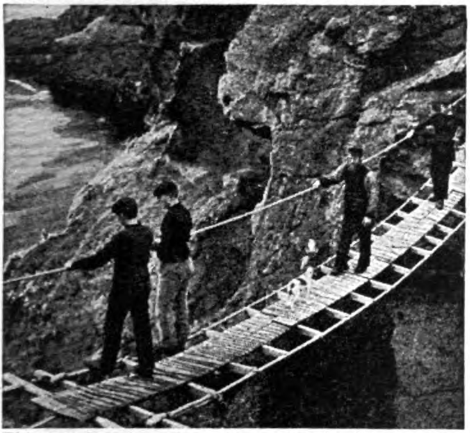
The Austrian Tyrol is very trying to the bridge-builder. Three chains of the Alps run through it, and terrible gorges and chasms have to be crossed where the railways run, as we see here at Waldi Tora. This is a fine piece of work, in solid stone and with a single span, and harmonises with the rugged grandeur of the scene. The village is far below in the valley. There the natives live the old life while the new life passes over their heads.

The Marble Bridge, copyright by Underwood & Underwood, N.Y.

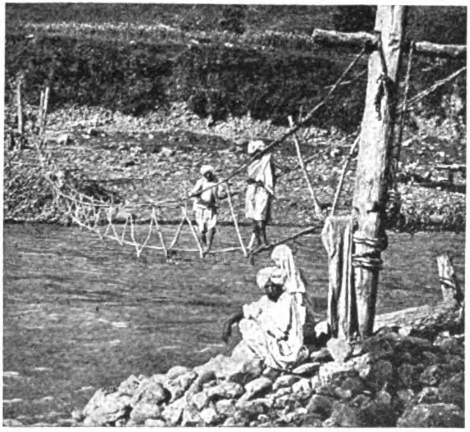
OLD-FASHIONED PATHS IN THE AIR



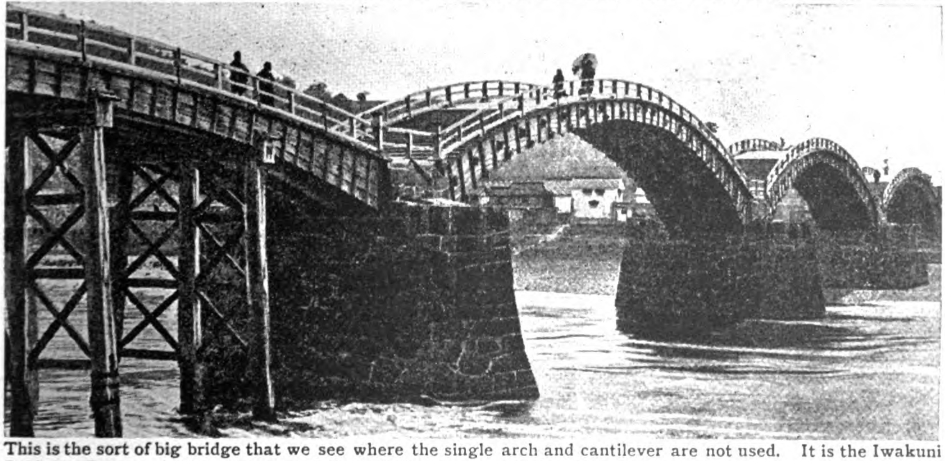
This picture gives us an idea of what our bridges were like once upon a time. Here is one built on piers made of nothing but logs. On top there is a roadway of timber. This is the bridge at Sringar, the beautiful old capital of Cashmere, Northern India. The houses recall the bridges of old-time London with their shops and dwellings.



This rough-and-ready bridge serves for fishermen to pass to a rock off the coast of Antrim, Ireland. It consists only of strong ropes and staves of wood. In stormy weather it sways and needs courage to cross.



Tight-rope walkers should like this bridge. It is made up of three ropes. Two of the ropes serve as handrails; the third is the footpath. It crosses a river in India, which has many modest suspension bridges like it.

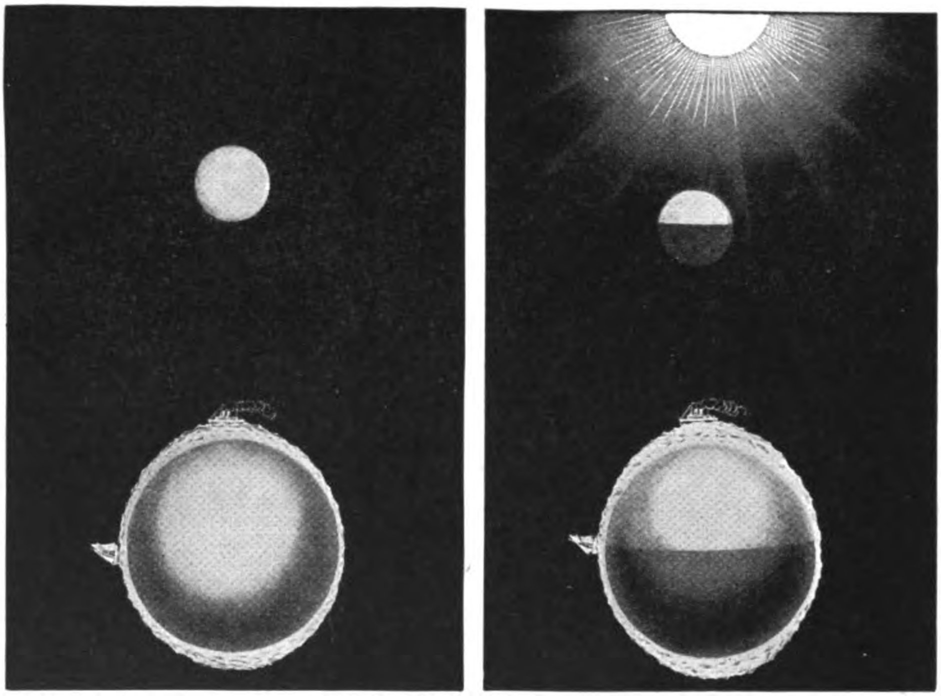


This is the sort of big bridge that we see where the single arch and cantilever are not used. It is the Iwakuni Bridge in Japan, a bridge of wood and stone, in four spans. Only small ships can pass under it, and the roadway is as steep as a switchback ladder, and is furnished with 200 steps. Horses and carts cannot go over it.

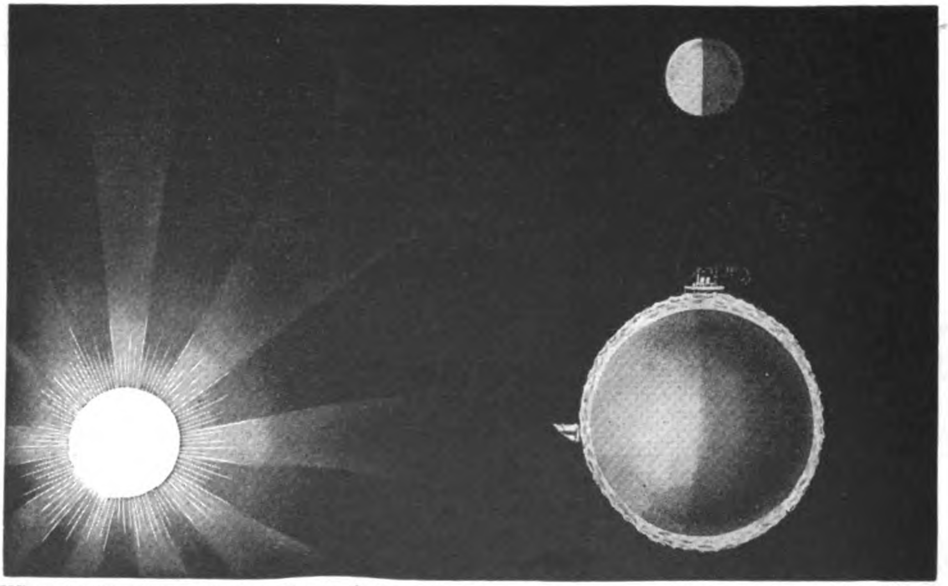
THE NEXT PICTURES OF FAMILIAR THINGS BEGIN ON PAGE 73.

Two middle pictures, copyright by Underwood & Underwood, N.Y.

THE SUN, THE MOON, AND THE TIDES



The first of these pictures shows how the moon attracts, or draws up, the earth's water on the side nearest to it, causing a high tide there; then it draws the earth itself away from the water on the other side, leaving a high tide there. The second picture shows that it is not only the moon that makes the tides. The sun does its part, although, being so much farther away, it is less powerful than the moon. When the sun and the moon are both pulling the same way we have very high tides, which are called spring tides.



When the moon is pulling upon the earth in one direction and the sun is pulling in another, as shown here, the tides are not so strong as at other times, because the pull of the sun is telling against the pull of the moon. These lesser tides are called neap tides, neap meaning narrow or scanty. Spring tides are so called because the water is then said to spring up or leap. As these pictures show, when the tide is high in some parts of the world it must be low in other parts, because the water is drawn away from those other parts.

I WONDER WHY

All our lives we are asking questions; all our lives we are saying to ourselves, "I wonder why." Why is it dark at night? Where do I go in my sleep? How do I remember? To all of us come such questions as these, and as long as we live, however wise we grow, such questions will come. The questions will never stop as long as the world lasts, because out of the answer to one question another question grows; and so, all through the world and down all the ages of time, people have been saying to themselves, "I wonder why." All through our book we shall find the answers to our questions, but in this part we shall find questions about many things which we particularly want to know. We learn, first of all, what causes the tides, and why they come in and go out and are so much higher at one time in the year. We will learn why oil will not mix with water, where a flower gets its smell, how a camera takes a picture, why we do not see things upside down, and many other interesting things.

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DOES THE MOON PULL THE SEA?

The moon does pull the sea, and it is the pulling of the sea by the moon that makes the tides. In any great dock or port or harbour we see how the water rises and falls twice a day, and we know that it is the tides, as we call them, with their increasing ebb and flow, which bring all this water to us and take it away again without ever stopping. The tides never stop because the earth never stops turning, and it is the turning of the earth that somehow makes the tides. Plainly *tides* have something to do with *days*, for they always correspond. Long ages ago, even before men knew that the earth turns, they saw, as they could not help seeing, that the tides have something to do with the moon. Nowadays we can answer the questions about the tides very completely.

HOW DOES THE MOON CAUSE THE TIDES?

Let us suppose for a moment that the moon did not go round the earth, but simply moved through space with it. Then the moon would appear to rise and set, as it does now, only it would rise and set at the same time every day. And so, at the same time every day, in any part of the world, there would be tides, as there are now. The only difference between this and what actually happens is that the moon is moving round the earth, while the earth turns upon herself. This makes the moon seem to rise and set, in any place, about half an hour or so later every day; and the tides, we find, always correspond.

The moon is made of matter, and so is the water of the sea. All matter everywhere pulls, and is pulled towards, all other matter everywhere. We call this gravitation. So far as the whole earth is solid, the whole earth, and the whole moon, are affected by this pull; but as part of the earth is ocean, so to speak, and as water is not rigid, it can be, and is, specially affected by gravitation. The water opposite the moon at any time is pulled up towards the moon; and as the earth is turning all the time, this really means that a mighty heaped wave of water travels over all the oceans, day and night, in response to the pull of the moon. If the moon had oceans, there would be tides there too, owing to the earth's pull; and as the earth is very much bigger than the moon, these tides would be enormous. But the moon has no oceans, though possibly it has ocean-beds, long since dried up. All the moon does is simply to pull the water towards it as the earth twists and exposes new parts of water to its action.

DOES THE SUN MAKE TIDES?

The sun also makes tides on the earth, just as the moon does, and for exactly the same reason; but the power of gravitation lessens very quickly as the distance through which it acts increases. Thus, though the sun is vastly bigger than the moon, it is so far away compared with the moon that its influence on the ocean is comparatively small; but it can be shown.

DO THE SUN AND THE MOON PULL THE EARTH AT THE SAME TIME?

We have just said that the principal consequence of the *real* motion of the moon round the earth is simply that the moon seems to rise anywhere at a different time every day or night, and so the tide changes also every day. But there is another consequence. As the moon goes round the earth once every month, there will always be times when the moon and the sun are on the same side of the earth, and times when they are on opposite sides of the earth; while, in "between times," the lines from the sun to the earth, and from the moon to the earth, will be at right angles, or nearly so, to each other.

Now, when the sun and moon are pulling on the same side of the earth, they help each other; and the tides during a few days will be very high and very low as the water flows and ebbs. At another part of the month, when moon and sun are on opposite sides of the earth, they pull against each other. The moon wins this tug-of-war, but it has to be content with pulling the water towards itself much less than at the other time, because the sun's pull is now opposing, and not helping the moon. At the other times the tides will neither be very marked nor very little marked, but "betwixt and between." Watch the tides anywhere day by day for a month, and you will see all this for yourself.

WHY DOES THE TIDE COME IN AND GO OUT?

We should think of the shore as if it were part of a saucer partly filled with water; then if the water is added to, the "tide" will rise. To raise the level of the water is to cover more of the saucer, and *vice versâ*. And so we shall understand how the tide comes in and goes out at very different rates, apparently, in different places. In a dock, where the water is all heaped up and deep, it needs the addition of much water to make any difference that we can notice; the tide seems to rise slowly. But where the shore is very flat, then the added water—due to the pull of the moon, as we know—spreads itself out over a wide space, and we say that the tide comes in quickly. If you pour a tablespoonful of water into a vase with very steep sides, you do not cover much more of the sides of the vase with it; but if you pour the same amount of water on a flat table, of course it covers a lot of the table. There are places where the shore is so nearly flat that the tide comes in much more quickly than a man can run—comes in in a great tidal wave which even a man on horseback may fail to escape, so quickly does it run. On page 470 of this book is a well-known song called "The Sands of Dee," a poem by Charles Kingsley, which tells how a girl was drowned in this way.

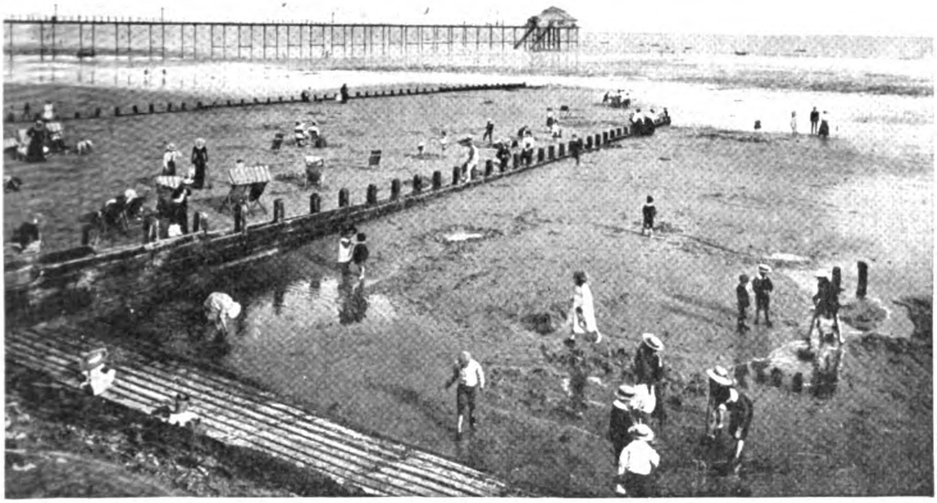
WILL THE EARTH EVER LOSE THE MOON, AND WILL TIDES THEN CEASE?

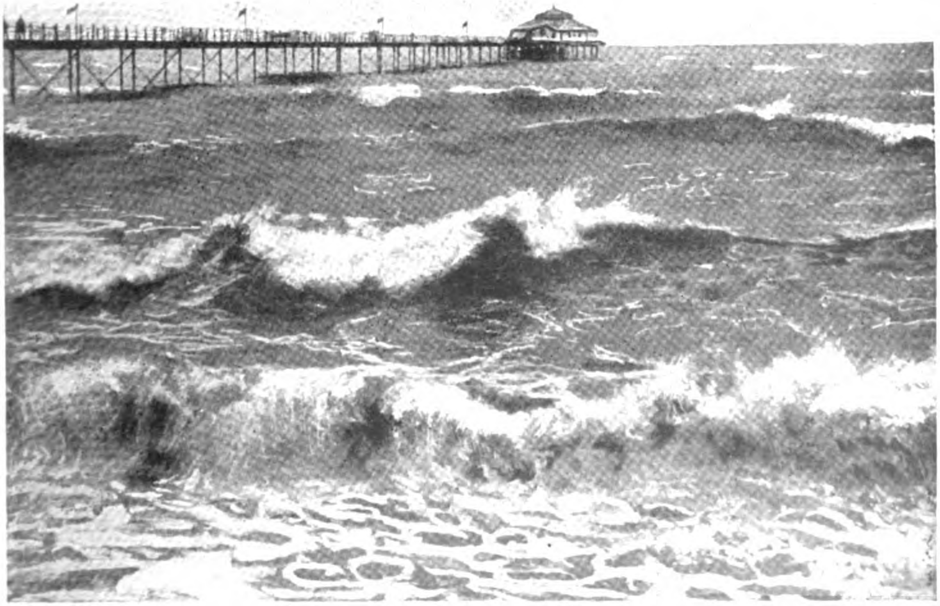
The answer to the first of these questions is no, for there is a limit to the distance that the moon can go from the earth; and astronomers believe that when the moon reaches that distance it will begin to come nearer to the earth again. Indeed, they believe that some day the moon must return to the earth which gave it birth, and *then*, certainly, the tides will greatly diminish, for the sun alone will be left to produce them. The sun-raised tides will remain, but very different tides indeed from those which the sun raised upon the earth ages ago—perhaps 60,000,000 years ago, as has been estimated—when the solid crust of the earth was not formed, and when all the water of the earth was suspended in the atmosphere, as some of it is suspended even now, in the form of water vapour. Those were tides indeed, for there was no dry land then, and the great tidal wave flowed without end over the whole earth as it turned and turned under the steady pull of the sun. Not only so, but the moving liquid of those tides was not mere cool water, but *flowing rock*, like the red-hot lava that flows out of volcanoes sometimes.

WILL THE MOON EVER RACE THE EARTH IN SPACE?

The moon travels more slowly than the earth, but it is calculated that some day the moon will go round the earth at the same rate as the earth twists on itself. If that ever happens, the tides

HOW THE SEA MOVES BACKWARDS AND FORWARDS

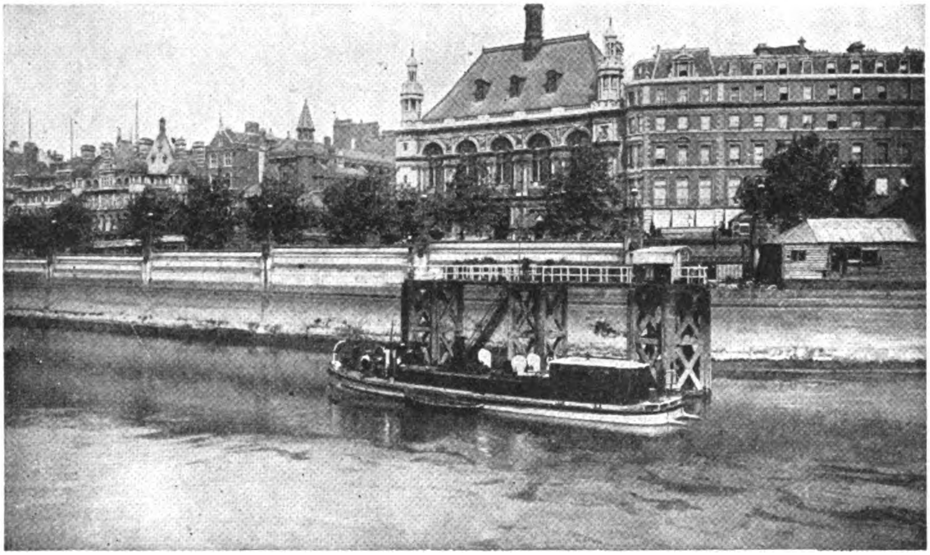




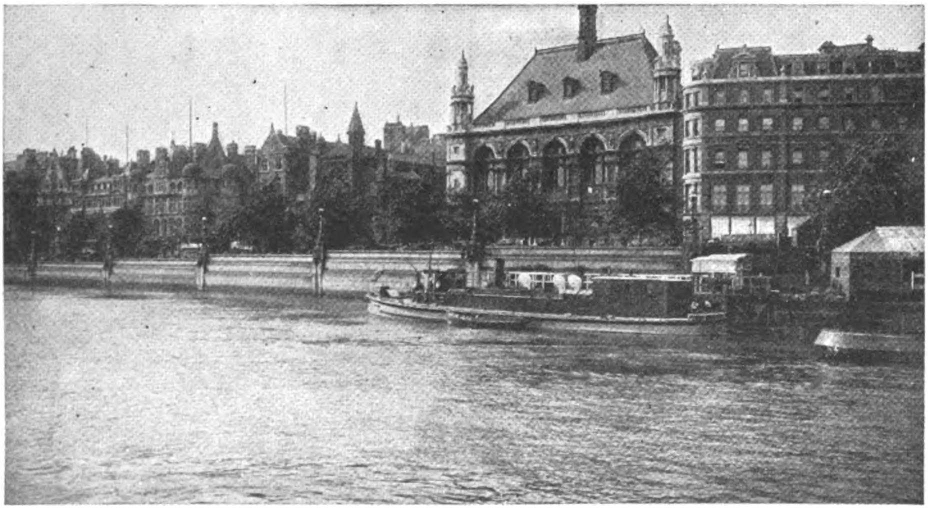
What a difference high tide and low tide make at the seaside! At low tide we can play upon the beach; at high tide we cannot, because the waves wash over it. The tides are caused by the attraction of the moon and sun upon the waters of the ocean, but specially by the moon, which is nearer to us than the sun is. The moon draws the water like a magnet, and makes it get heaped up more on one side of the earth than on the other. But the earth turns round every twenty-four hours, and so the heaped water, or tide, travels round it, leaving those places on the shores dry which before were covered with the waters. This is how it is the tides are regular as clocks.

THE WATER THAT COMES AND GOES EVERY DAY

There is the sea being pulled by the moon, which draws it as a magnet draws steel, and sends up the water rolling towards the shore. It will dash up against the rocks, and flow up the mouths of rivers and into docks, and cause high tides in them, just as it does upon the beach where children play. Nothing can stop it in its course.



It is a wonderful thing to remember, as we watch the tide creeping towards the beach, that boys and girls may be watching the effect of the same tide many miles away in a great country. We can stand on the banks of the Hudson, at Albany, N.Y., and watch the effect of the sea, which is 145 miles away. Here are two pictures of the Thames, in London. The tide has gone down, and the water is very low and does not nearly fill the channel.



The tide turns. The sea forces its way up the bed of the Thames and hinders the river from flowing out. The mud banks disappear; the channel fills up. Boats and barges float, and where there was mud before we find at high tide 21 feet of water. The water has risen as high as a two-storey house, and millions of gallons of water have come up from the sea to London to stay for a few hours and then go back again.

raised by the moon may cease, even though the earth does not lose the moon. The two will move for a time together as if a solid bar of steel ran between them; though, if such a bar of steel were required, one big enough to hold moon and earth together would have to be so big that the moon would not be big enough for the bar to be attached to it. Another way of saying what we have just said is that the day and the month will get to be of the same length—after long ages in which the day gradually becomes longer and the month gradually shorter.

IS IT TRUE THAT THE DAY IS BECOMING LONGER?

When we study the tides closely—and, indeed, many a big book might be written about them—we learn a most amazing fact about them. It is that, as the earth spins, its movement is made slower by the friction of the tides which the moon principally, and the sun to a slight extent, is always moving over its surface. The tides act as a sort of brake upon the rotation, or spinning, of the earth, so that, year by year and age by age, the earth is now, and has long been, taking a little longer than it used to take to spin round completely once.

In other words, the day—which is the time of one earth-spin—is really getting longer. Many estimates have been made of the extent of this, and all are very doubtful; but it is probable that in the course of a century the day becomes nearly a second longer. You will say that is not much; but a century is but a moment in the life of the world, and even seconds mount up if you have an endless addition of them.

WILL THE EARTH GO ON MOVING AT THE SAME RATE FOR EVER?

No; we have just read that the day is getting longer because the tides are slowing down the mighty top we call the earth. If you rest your finger against a spinning top you will slow it down; it will take longer to spin round; and if there were a bright light in one corner of the room, and if there were a living and intelligent creature on the top, he would notice that his "day" became longer. This has nothing to do with the lengthening and shortening of daylight at different times of the year; we are talking about the real day of twenty-four hours—that means one complete spin of the top on which we live.

ARE THERE TIDES OF FIRE ON THE SUN?

We have said that if the moon had oceans they would show tides. Now, the sun has no oceans of wet water, but it has oceans, or one continuous ocean-covering, of fiery gases; and we know that the sun, like the earth, spins upon itself, and in the same direction as the earth. Thus, the surface of the sun is pulled out of shape as the sun spins by the pull of the earth, and perhaps also of the other planets, especially such a great planet as Jupiter.

When I say "perhaps," I mean only that perhaps there is a pull sufficient for us to notice. There *must* be a pull, for gravitation always acts between all portions of matter everywhere, only it is not always so marked that we can notice the results. These earth-raised tides upon the sun may be tremendous things, even more tremendous than the sun-raised tides upon the molten earth of long ago; but in both cases no harm can come to any living thing, as life cannot exist at all under such conditions.

DOES THE SUN MAKE TIDES IN THE AIR?

When we are thinking of these tides of gas upon the surface of the sun, we must remember that our own atmosphere, which we call the air, is itself made of matter, and is therefore subject to the gravitational pull of both moon and sun. Thus, there must be atmospheric tides as well as ocean tides, though we know very little about them yet; and these gaseous tides, unlike those of the sun, may be of great importance to life, since they affect the great envelope of gas which sustains all the life of the earth. We are only at the beginning of our study of the weather yet; and some day the atmospheric tides may help us to explain many or some of its doings.

WHY WILL OIL NOT MIX WITH WATER?

When two lots of liquid, added together, mix perfectly, it is because the molecules that make up the one liquid are just as ready to link on with the molecules of the other liquid as with each other. The most perfect case is, of course, when the two liquids are the same, as when water is added to water; and the next most perfect case is where the liquids are very similar, so far as the linkage of their molecules is concerned, as when water and alcohol are mixed. But when oil and water are added to each other, we have two liquids which are made of very different kinds of molecules. The molecules of water are very small, and those of oil are enormous—made of great numbers of atoms, instead of only three apiece, as water is. And the large molecules of oil find it very much more natural and easy to link with each other than with the molecules of water, and the molecules of water find it very much more natural and easy to link with each other than with the molecules of oil, so that, as a visible result of these invisible causes, the oil and the water keep apart.

WHERE DOES A FLOWER GET ITS SMELL FROM?

The smell of flowers is due to special kinds of essences or oils which the plant makes within itself for its own purposes. Some of these are very like each other, and, indeed, there is perhaps a very general kind of family resemblance between most of them, especially when they are made by plants which belong to the same family or order. Almost all the plants which make these oils seem to go to work on the same general principles, and the type of them is the oil which we usually call turpentine, and which is made by a special kind of plant.

This oil is really a very complicated compound of only two elements—carbon and hydrogen. This class of compounds is often called the *volatile* oils, for volatile simply means *flying*. And this tells us that they very readily escape into the air, and move about in it. Of course, if they did not do that, we should not be able to smell flowers by merely holding our noses near them. We find in these volatile oils some of the useful things that the plant world affords us. As they nearly all consist of carbon and hydrogen, and if they have oxygen in them, too, never have much, they could all be burnt; but they are much too expensive to use for that purpose, since, after all, the sweetest or strongest smelling plant only contains a very tiny quantity of the oil. The real uses of these oils are, first, to provide us with the pleasant scents that we know; second, to keep off insects when they are troublesome in their desire to sting or bite us; and, third, to kill all sorts of microbes—for they are one and all poisonous to microbes.

WHAT GOOD DOES SMELL DO FOR FLOWERS?

But we must remember that the plant makes its volatile oil not really for us, but for the needs and purposes of its own life. And so it is, in truth, much more interesting to learn, if we can, *why* the plant should make its oil, than to learn why we are glad to squeeze the poor dead plant and get the oil out of it.

Well, we first notice that, as a rule, it is the flower that bears the scent; not the root or the stem, or even the leaves, but specially the flowers. We shall see the meaning of this, if we remember what the flower itself exists for. The plant makes flowers because by them it bears the seeds which, when they are made ready, and have fallen upon the earth, will give birth to a new plant. Most commonly, it is the visits of certain insects that prepare the seed for its burial in the earth, where it will grow into a new plant. The insect has visited another flower of the same kind of plant, and brings from that something which it gives to the second plant, so as to prepare the seeds.

Now, it is necessary that the insect should somehow be attracted to the flowers. First, then, the plant makes its flowers beautiful and easily seen, so that the insect may notice them; and, secondly, it very often makes a fragrant scent, so that the insect, which has a very keen sense of smell, may be attracted by that also. On the other hand, there are often microbes about which may attack the precious flower; but microbes are killed by these volatile oils.

WHY DO NOT ALL FLOWERS SMELL SWEET?

It is not insects, but the wind, that does the work of carrying the *pollen*, as it is called, from one flower to another in the case of many plants, and these plants usually have very small and not at all showy flowers, and very little scent, or none; they do not need to attract insects. The plants without smell, or the plants that do not smell nice, are generally those that do not need the insects. Some flowers are very small and much hidden, like the violet; but they make up for this by having a particularly strong and delicious scent to lead insects to them.

HOW DOES A CAMERA TAKE A PICTURE?

The pictures on page 41 really show us quite well how a camera takes a picture. If we understand the eye, we understand a camera. In both there is a dark chamber (camera is simply Italian for chamber), a lens, or lenses, in front, and a sensitive screen, or curtain, or " plate," or " film," behind. All the light allowed into the chamber must come through the lens or lenses, and they throw it—upside down, as the pictures show—on to the screen or plate behind. In the case of the eye, we cannot quite explain how the screen is able to register the light that falls on it, and we are still farther from even guessing how the nerve running to the brain is able to tell the brain what has been happening on the screen.

But in the case of the camera the thing is really quite simple. We merely take a plate of glass, or nowadays often a film of gelatine, and we place upon the plate or film a thin and smooth layer of some chemical compound which light has the power of decomposing—for instance, a salt of silver. So where the light falls the layer of salt is decomposed, and where the light is brightest the decomposition is most complete.

WHAT HAPPENS INSIDE THE CAMERA?

A white thing, like a collar, sends strong white light on to the film or plate, and quite destroys the layer of salt it finds there. Then we do something to the film or plate, so that no light can do any more to it, and when we look at it we find dark places corresponding to the brightest and lightest parts of the thing we were photographing, and *vice versâ*. The light from the thing we photograph—that is to say, the thing—has printed itself dark, and where there is " nothing " to photograph, white is left. As everything is the opposite, or negative, of what it really should be, we call this plate the *negative*. We then let light shine through the negative on to a sensitive piece of darkish *paper*, and now the salt, where it remains, keeps the light from the paper, and, where it has been destroyed, the light gets through and bleaches the paper. So we get a *positive* picture, in which light and dark correspond to the light and dark of the original. *Photo* means light, and *graph* means writing. A photograph is a thing that has been written by light.

WHY DOES A CAMERA TAKE PICTURES UPSIDE DOWN?

The pictures on page 40 will answer this question for you, said the Wise Man. When a ray of light passes through a piece of glass, like that shown in the picture, curved as a marble is curved, it is bent towards the thickest part of the lens, as the piece of glass is called ; and if you look at the picture at the bottom of the page you will see at once that, in such a case, when the rays have come through the lens, those which were at the top will now be at the bottom, and those which were at the bottom will be at the top. In the same way those which struck the lens on the right will come out at the left, and those which struck the lens on the left will come out on the right.

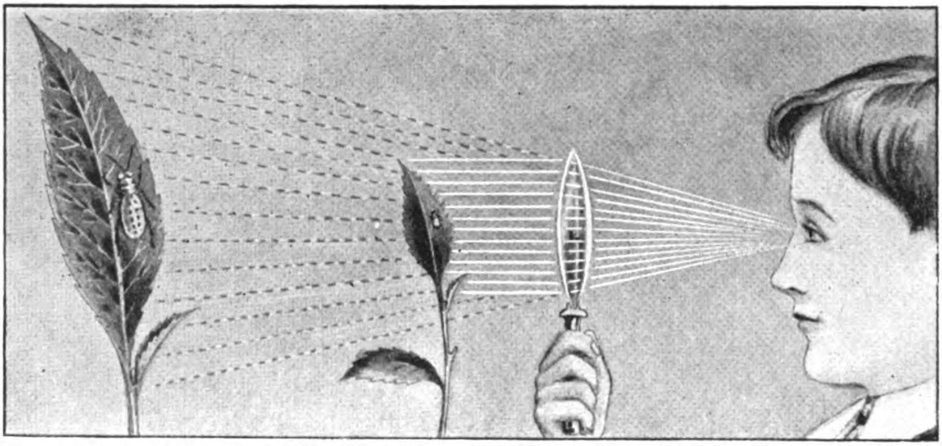
Now, the pictures on page 41 show us that our own eyes are just like a camera in this respect. Like the camera, they have a lens in front and a sensitive plate behind, only it is a plate which never needs changing. The rays of light have to follow the same rule in the camera of the eye as they do anywhere else, and so the images of everything that we see are thrown upon the screen, or curtain, or retina, of the eye, as it is called, with the top at the bottom and the bottom at the top, and with the right to the left and the left to the right ; and yet we do not see things upside down !

WHY DO WE NOT SEE THINGS UPSIDE DOWN?

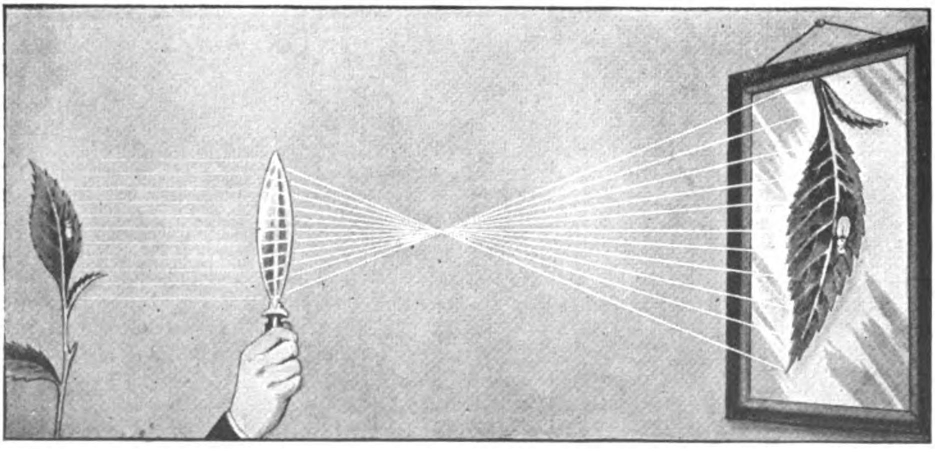
There are many people who can never understand the answer to this question. It is really a hard question, and many silly answers have been given to it. People have said that we do see things upside down, but that, by custom and experience, we think we see them right side up ! In order to support this answer, it has been declared that a person born blind, but having sight given him by an operation when he was grown up, would see things upside down ! But the reply to that is that such a person does not see things upside down, but right side up. Only, like a baby, and for the same reason, he cannot judge the distance of things, and at first he stretches out his hand for things that are far away.

The real answer to this question that has puzzled so many people is that the question is nonsense, and that is

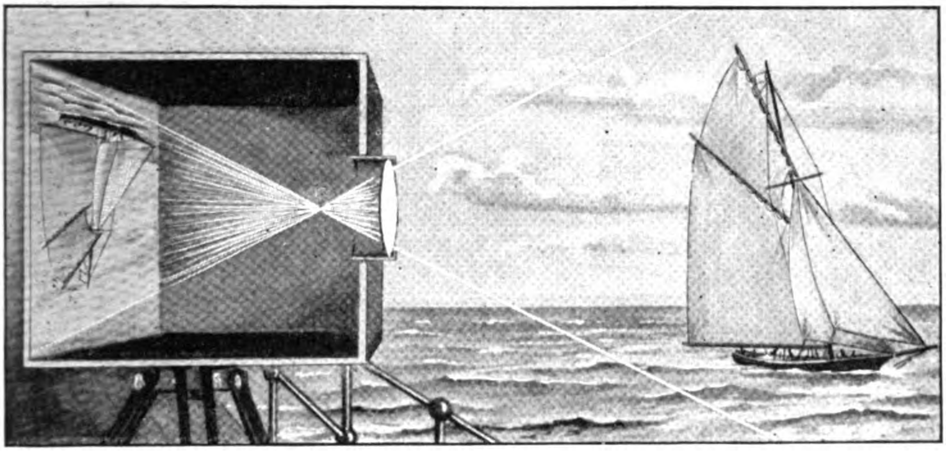
HOW A MAGNIFYING GLASS MAKES THINGS BIGGER



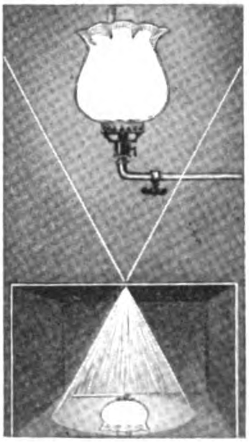
These pictures show us how a magnifying glass makes things appear larger than they really are. What happens when we look at, say, a leaf, is that rays of light are thrown off by the leaf and brought together to our eyes. When we use a magnifying glass the rays of light pass through the glass and bend—as a stick appears to bend if you put it in water, or as the pair of compasses seems to bend in the glass of water shown on this page. When the rays of light reach the eye, the eye imagines that they have come in straight lines, and it appears to the eye that the light comes in lines, as shown by the dots in this picture. What we really see are rays of light. These rays, not being able to go straight through a magnifying glass as if it were a piece of ordinary glass, are bent in passing through the glass, and what happens then is as if the eye, having collected all these rays to a point, throws them out again in straight sloping lines, at the end of which we see the image, looking much bigger than it really is. So that what we see through a magnifying glass is not the actual leaf, but the rays of light thrown off by the leaf, first bent by the glass and then straightened out again so as to appear to cover a much bigger space. A curious thing happens if the rays of light are allowed to continue beyond the eye instead of being focussed by the eye. We can do this with the aid of a microscope, as shown in the bottom picture. In this case we see the leaf upside down. This is because the rays of light meet, and then, as the rays must go straight, the line of light coming from the top of the leaf goes down, while the line coming from the bottom of the leaf goes up. In the top picture the meeting, or focussing, of the lines of light takes place *inside the eye*, but in the picture below we see the rays focussed through the glass instead of inside the eye, and we see them, therefore, continuing until they are reflected in the looking-glass, where we see the enlarged picture upside down. This helps us to understand what happens inside the eye, as explained on the next page.

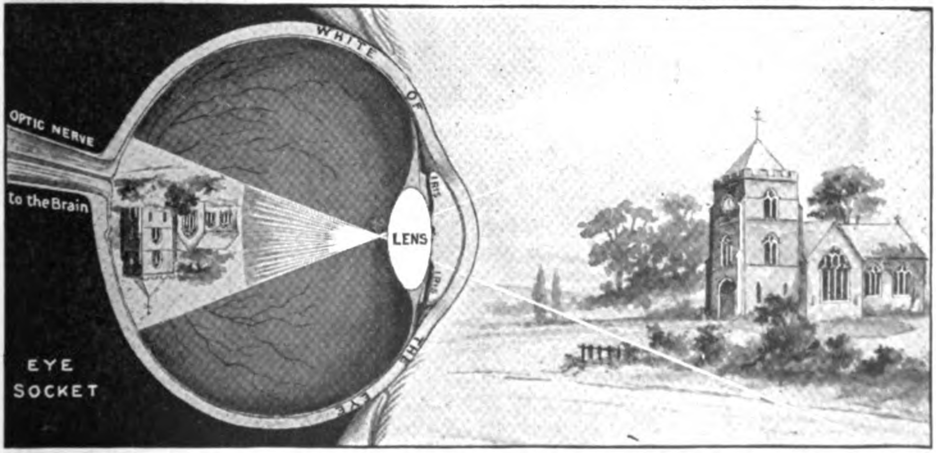


HOW THE CAMERA TAKES YOUR PHOTOGRAPH



These pictures show us how a camera takes a picture, why it takes the picture upside down, and also how the eye is like a camera in this way. The boat in this picture gives off rays of light, which strike in all directions. Some of these rays go out towards the camera, and, as light always travels in straight lines, never crooked ones, all the rays that can be seen from the lens of the camera travel straight up or down towards the lens. Inside the lens they continue travelling in the same direction, and at last they meet and cross, so that the lines of light given off by the top of the boat strike the bottom of the photographic plate, and the lines given off by the bottom of the boat strike the top of the plate. The small picture on this page shows a way in which any boy or girl can find out how the lines of light cross so as to make an image upside down. Take a white cardboard box without the lid, and prick in one side a small hole with a pin. Hold the box, say, under a gas-jet, so that the gas will reflect through the hole. The hole will then act as a focus of the rays, which will enter the box through the hole and cross, so that the inside of the box, where they fall, will reflect the gas-jet, which will be upside down. The bottom picture shows us that the eye acts in the same way as the camera, but a very wonderful thing happens in the eye that no man quite understands. When the photographer finds that his picture is upside down, he turns the plate the other way and everything is right. But what wonderful thing is it that turns the picture printed inside the eye the right way up? The rays of light stamp themselves upon the retina of the eye as seen in this picture, and the nerve of the eye carries them to the brain. What happens there nobody knows, but when the brain brings together these rays of light so as to make a clear picture, the picture is the right way up. The picture is printed on the retina of the eye upside down, but our brain puts it right in the millionth part of the twinkling of an eye, and this is, perhaps, as great a miracle as anything that ever happened.





what we cannot understand until we have thought about it for a long time. Seeing is an act of the *mind;* and the mind is not a thing in space, like a chair, or your body. We seem to go on thinking that somewhere in the brain, where seeing is really done, there is a kind of man standing upright and looking at the picture thrown on the screen or retina of the eyes; and, as that is upside down, we wonder why *he* does not see it upside down. But we have no right to think of the mind as if it were a person standing upright. Suppose that the mind really were a person, what right have we to say he is standing upright? Suppose I were to say that he was standing on his head (which would, of course, solve the difficulty, as then he would see the eye-picture right side up), how could that be disproved? That, said the Wise Man, is my own way of trying to explain this; but if I said so I should be talking just as much nonsense as anyone who said that there was a person standing upright in the brain. The being that sees is MIND; how it sees, and what mind is, no one can tell us yet.

WHY DO THINGS LOOK BIGGER THROUGH A MAGNIFYING GLASS?

The laws which explain this are really the same as those which explained the last question. If you take a magnifying glass and hold it far away from your eye, you see a very small picture upside down of what is beyond it. That is what happens in our own eyes, and that is what happens in a camera. But if you take that same magnifying glass and hold it over this page, then, instead of getting a small image upside down, you get a large image of the page right side up.

The fact is that you have put your eye in the way of the rays of light coming through the glass before they have crossed, but as they are meeting each other. Your eye, then, imagines that it sees the letters much larger than they are, because the rays as they come to it look as if they came along the dotted lines in the picture. But you can understand that if you moved your eye far away back from the magnifying glass, so that the rays of light had crossed before they reached it, then everything would be quite different. I think you ought to get a little magnifying glass, and discover for yourself the two kinds of pictures of the same thing, very different from each other, that can be seen through it.

WHY DO WE SEE A BLACK SPOT IN THE SKY AFTER LOOKING AT THE SUN?

We said just now that the retina, or screen, or curtain, or sensitive plate, at the back of the eye never needs changing. You can see one picture after another, day after day, and year after year. But it is possible to work this screen too hard; it is a living thing, and it is just because it is alive that it is able to recover itself, and, so to speak, make itself fresh again—if it has time—for every new picture that we see with it. A photographic plate *sees*, as we may say, because certain chemical compounds that are upon it are changed by the light. The retina of the eye *sees* in the same way, but because it is alive it has the power of making afresh from moment to moment the particular kind of stuff that the light acts upon.

But if you stare hard at any light so intense as the sun itself, then, at that spot of the retina where the light falls, all the reserve supply of this sensitive stuff is used up; and now if you turn your eyes somewhere else, that particular spot is useless for the moment; it is blind, it sees nothing. But if it sees nothing, whereas all the retina round it sees light, that gives us the notion that we see a black spot—that is to say, a spot from which no light comes. But in a second or two this wonderful living screen recovers itself, makes a fresh supply of the stuff light acts upon, and the black spot disappears.

HOW DID THE BLACK MEN GET BLACK?

Nobody knows the complete answer to a question like this, because the origin of the different races of mankind is lost in very ancient history, long before we have any definite records; but we know that we find black people living in the hottest parts of the earth, in many places where white men find it impossible to live. So that evidently the black races have developed some power of resisting the climate in these spots, and also the diseases peculiar to those parts of the world; a power of resistance which the white man has not.

As a result of this, it would come about that only those who were black could live and survive there, and in course of time there would be nobody except the black people in such places, a black race thus being produced by Nature selecting the blackest people as those best fitted to survive there. The blackness is probably the result of the continued exposure to the great heat of the sun in the tropical countries. Other people have thought that black was the original colour of the human race, and that the white races have arisen from them. Whatever is the reason, the colour of the skin evidently results from certain powers of human beings to adapt themselves to the climates in which they live.

WHERE DO FLIES GO IN THE WINTER?

Most flies live their lives in spring and summer, then die. Some of them are fortunate enough to find a place where they can hide and obtain warmth to keep them alive. They hide in quiet places about the house, in outbuildings, in the fields and stables, where we should never dream of looking for them. They do not feed. They simply lie dormant, sleeping as a squirrel in his nest, or a bear in his den, or a tortoise in his shell, sleeps the cold days away. But an unexpected warm day in winter comes. The fly feels the extra warmth. It wakes him, makes him hungry. and sends him forth to seek food. The warm day passes, and he may get back to safe hiding; but most likely he will not. Probably the cold will return and kill him. Very few flies manage to get through the winter. If they are not worn out and ready to die at the end of the summer, many of them are killed by a fungus which, floating in the air, settles on their bodies, drives roots into their insides, and destroys them. Those we see dead on the window-pane, swollen, with a little halo on the glass about them, have been killed in this way.

DO FLIES LAY EGGS?

As nearly all the flies die this year, leaving few to struggle through the winter, it seems strange, of course, that next year we shall have as many flies as ever. The reason is that the female fly lays an egg that changes into a chrysalis, and is kept in that form during the winter, until the warm weather of spring brings out the young fly. The eggs turn at first into maggots, and from maggots into pupæ, which are a sort of chrysalis. In the chrysalis the body of the new fly forms. Millions and millions of flies lay eggs in the autumn. If all these eggs hatched at once, nearly all the flies would die during the winter. Now, the first touch of cold causes the living insect in the chrysalis to stop growing, to become dormant like the bear asleep in winter. A fruit-bud on a tree, when a frost comes, goes to sleep and does not open until warm weather has set it growing again. So it is with the chrysalis of the fly. These pupæ or chrysalises, as we may call them, lie in the ground, or in the heart of barley or corn which has been cut and stacked for the winter, and so are safe from the cold. The maggots from the flies' eggs can bore and tunnel like worms, and make their way to safety, so that they can, in their chrysalis form, lie safe and snug all the winter.

WHERE DO NEXT YEAR'S FLIES COME FROM?

No matter how long the winter lasts, the chrysalis of the fly is safe. When the warm spring weather comes, the fly inside the chrysalis goes on growing again. At the right moment it bursts open its brown horny case, and comes out like a chicken from its shell. All that it has to do is to dry its wings; then it can fly away full grown.

Flies reach their full size before coming out of their shell-like covering. When you see small flies and big flies together, you must not think that the little ones are young and the big ones old. They are different sorts of flies, but full grown. They reach full size before they are released from the cradle in which they have passed the winter. It is because most of the old ones are dead, and the young ones still in their eggs, that we seldom see flies in winter.

As the weather gets colder, the flies seem to get sleepier and sleepier, until it is difficult to get them to move off any object on which they have settled. They are not even ready to brush up their wings and clean themselves as they did early in the summer, and easily fall into the milk-pitcher. These are signs that their little lives will soon be ended, for winter is too severe for them. It is their children we shall see next spring.

The next Questions are on page 89.

ANIMALS THAT LIVED BEFORE MAN

The flying reptile
called pterodactyle

The giant lizard with two brains
called stegosaurus

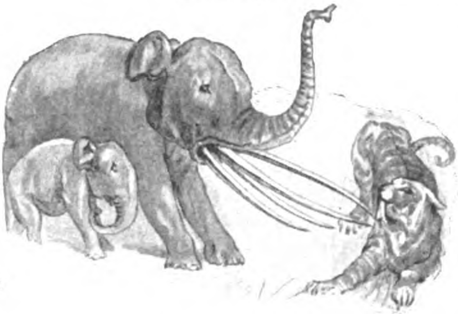
The flying reptile
called pterodactyle

Lizard with feet like a bird
called iguanodon

First known air-breathing animal
called archægosaurus

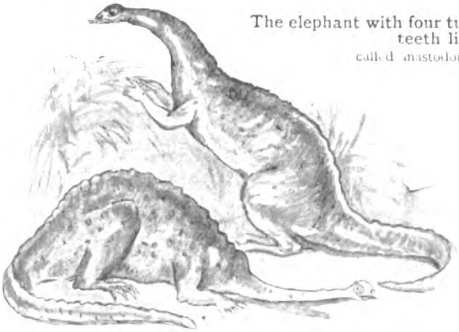
Horned animal like an antelope
called sivatherium

The armadillo, like a giant tortoise
called glyptodon



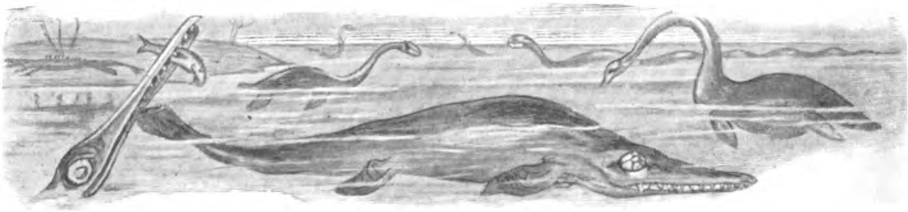
The elephant with four tusks fighting the tiger with teeth like swords
called mastodon and machairodus

The great monster with six horns
called dinoceras



The great lizard with feet as big as a table
called brontosaurus

The giant elephant that the first men fought
called mammoth



The fish-lizard of the sea
called ichthyosaurus

The fish-lizard with a neck like a snake
called plesiosaurus

THE STORY OF THE ANIMALS

NATURE, a wise man said, is the mother of us all. By Nature we really mean the whole of life—everything that is not made by man. But many natural things, such as the sun and moon and the earth itself, come into other parts of our book, and here we shall read of the two most important things in Nature—Animal Life and Plant Life. There were plants on the earth before the animals came, but it is better to begin with animals, and our book of Nature tells us first the story of the animals, and then the story of flowers and trees. We shall not tell our story as grown-up people do, with big words and strange names; but we shall learn all that we need know now about animals and flowers. The beginning of our story tells us of the wonderful things that live in the world with us, and the huge monsters that once lived upon earth and have now passed away.

NATURE'S WONDERFUL FAMILY

By ERNEST A. BRYANT

WHEN we are kept awake at night by the noise which cats in the garden make, perhaps we wish that there were no such things as cats. Let us suppose that all the cats were sent out of this country. We know that our houses would soon be swarming with rats and mice. But something far more strange than that would happen. Soon, nearly all those beautiful wild flowers called heartsease would fade away and die. We should have scarcely a heartsease left. That would be because the cats were gone.

What does the cat do to make the heartsease grow? Nothing at all. It never touches a heartsease if it can help it!

Well, why would the heartsease die if the cats were to go away? Because, if the cats went away, they could not catch the field-mice. Soon there would be so many field-mice that they would eat up all the nests of the bumble bees in the fields. Now, the bumble bees are the little friends which make the heartsease grow. The heartsease has a sweet juice which the bumble bees love. The bumble bees fly into the heartsease to drink this juice, and in doing so they carry in with them from other plants a dust, called pollen, which the heartsease needs to make its seeds. If it does not get that dust the heartsease must die. Therefore, if our gardens are to have this pretty flower, we must have cats to keep the field-mice from eating all the nests of the bumble bees. The cats do not kill all the field-mice. That would not do. They prevent the mice from becoming too many. Then, though a few mice do eat nests of the bumble bee, there are still enough bees left to bring the yellow dust to the heartsease.

That is a little thing which clever men were a long time in learning. We ought always to remember it, because it shows how Nature has to plan so that the world may go on in the best way for us. When we think of the world, we think of a great place where men and women and children live. But the world was not made simply to be a home for men and women and children. If there were no living creatures but ourselves, there would be a great many empty places in the world. There would be a great deal of work left undone. There are places in the world where we cannot live.

But Nature does not like empty spaces. She must have living creatures everywhere, in earth and sky and sea. And she has life everywhere.

Our eyes are not strong enough to see all the tiny things which live. If our eyes were as strong as the strongest magnifying glasses, we should see that the air we breathe is full of very tiny creatures. We should see that the soil in the garden swarms with little insects. We should see that the little drops of water which we drink have in them more living creatures than we can count. We know that there is life in the air as there is life in the sea. We can see the jellyfish floating on the top of the waves. We know that there are big fish and little fish beneath the surface. We know that there are monsters in the sea like whales and sharks, we know that deep down in the sea, deeper than the deepest coalpit in the world, there are creatures such as nobody has ever seen.

So there is life everywhere, all kinds of life, as is explained in the CHILD'S BOOK OF ITS OWN LIFE on page 61. Besides men and women and children, Nature has many workmen, great and small, to carry on the work of the world. Some are big, like elephants; some are so small that we cannot see them. Some fly in the air, some swim in the sea, some creep in the earth. Some live among us as our friends; some live wild in woods and mountains.

THE WAY WE SHALL READ ABOUT THE GREAT ANIMAL WORLD

We shall read of their wonderful ways. We shall see how all these animals, reptiles, birds, fishes, insects, belong to one great family; and how, though they seem so different, they are all the same in some ways. We shall see how men have tamed wild beasts, and how all this great kingdom of animal life is subject to man, the lord of all the animals.

We shall take the big animals and the reptiles first, then the birds, then the insects, and after that the fishes which live in the water, the monsters that look like fish but really are animals, the creatures that live in shells, and the creatures which, although they are really living animals, look like plants in the sea.

There have not always been the same sort of animals on the earth as now. Once upon a time, when there were no men and women and children on the earth, the only living creatures were strange and monstrous animals such as we see in our pictures. These huge creatures, bigger than any animals now alive, were the masters of the earth before man came. Some were so big that they could eat off the top branches of tall trees; some of the animals could fly and swim. The animals we know have come from these; through thousands and thousands of years the monsters were changing and passing away, until in their places we have the animals of our own time. Deep down in the rocks we find remains of the monsters still; sometimes when men dig deep down they come upon the whole body of an animal which must have died and been covered up when the rocks were being formed.

THE WONDERFUL WAY IN WHICH LIVING THINGS HAVE CHANGED

It has taken millions and millions of years to make the birds and animals the beautiful creatures that they now are. We read in another part of our book the story of how forests became changed into coal, and we have now to learn that living things have been changed just as strangely as the forests.

The story of the animals and birds makes us wonder if Nature tried all sorts of patterns before she made up her mind what sort of creatures should live in the seas and on the land. Once *all* creatures lived in the seas and rivers. Some lived in shells. Others were soft things like jelly, and had no backbones. These had all the sea to themselves for a very long time. But during this time they were growing into separate families, unlike those which had gone before. Proper fish began to swim about, and there were great sea-scorpions, as big as a tall man, and fishes with skins made like armour.

THE REPTILES, THE FLYING DRAGONS, THE BIRDS, AND MAN

After these there grew up great creatures which could live in the water or out of the water, as the hippopotamus can to-day. Then came enormous reptiles. We have nothing living now like the reptiles which, by slow degrees, came into existence millions of years ago. Some of them had bodies as large as elephants, with heads like lizards, and huge teeth. Some could fly, and some could swim as well as they could walk. From some of the flying monsters came the birds, and still later came animals which, instead of scales and bony spines and great plates of bone, had hair to cover them. Little by little the animals and birds changed, until they became the kind of creatures that are now living; and then, last of all, millions and millions of years after the lower animals, came man.

NATURE HAS BEEN PACKING HER BOX FOR MILLIONS OF YEARS

No man is clever enough to say how much time passed away while all this was happening, but we know that at one time certain kinds of creatures lived on the earth or in the waters, and that after these came creatures of a different kind. There are no books to tell us these things, because there were no men alive to write books, but we find the bodies of these creatures deep down in the rocks to-day. When you unpack a box you begin at the top, and you know that the things on the top were put last into the box, that those lower down were there before the top ones, and that the things at the bottom were put in first of all. Well, Nature has been packing away things in her cellars for millions and millions of years. Her box is the solid rock. It was not always solid rock. It was mud and water. The water dried up, and as thousands of years passed away the mud grew harder and harder, so that it is now rock, almost as hard as iron.

How do we find the old-time animals in these rocks? They were born, and lived, and died, and were covered over. Floods carried them away to the seas and lakes, where mud came swirling down with the water from the rivers. The bodies sank and were covered with layer after layer of mud. As time passed away, Nature dried up the seas and lakes, and, by pressure from within the earth, forced up the bed of the seas and lakes and rivers and made it dry land. The fishes and birds and animals which had died and been buried in the mud were sealed up in this mass, and as the mud hardened into rock these creatures became part of the stone.

HOW WE FIND THE ANIMALS THAT LIVED LONG AGO

When we dig deep down to-day we find animals, birds, and fishes, and even insects, many of them perfectly shaped, in the rock, where they have lain for millions of years. The mud which settled about them was so soft that it did not crush them out of shape. It preserved their shape, as it preserved the shape of the beautiful ferns printed in the coal. Some of the big things were just as carefully protected by the mud, without being turned to stone. Great animals like the mammoth, which was a sort of huge elephant covered with long hair, died thousands of years ago through sinking into deep mud in Siberia, and became frozen hard in that mud; and some of these have been found lately with flesh, and skin, and hair all preserved.

Of course, not all the creatures which were once alive have been preserved in this way. Many were destroyed in various ways after their death, but there still remains enough to show us what creatures of long ago were like, and to tell from what families those now on the earth first came. It seems very hard to believe that the birds, with their lovely plumage and their sweet song, came from ugly reptiles. But birds, like reptiles, have been found sealed up in rocks.

WHAT THE FIRST OF ALL BIRDS LOOKED LIKE

The oldest bird known is called the archæopteryx. That is a Greek word, which really means "ancient wing." It was an extraordinary bird. It had a long tail, not all feathers as a bird's tail is now, but like a lizard's tail, long and thick, with bones and flesh, and with feathers growing from it. It had two legs, with which it could walk or perch in the trees, but it had two other limbs like hands, which it probably used to climb about the trees instead of flying from bough to bough, as birds now do. It had a curious eye fitted with a sort of armour shield as the reptiles have, and its beak was armed with great strong teeth.

Of course, there is no such bird as this now, and it is not surprising that such a bird should pass away. Even in these days two or three strange birds have died out. The dodo was quite common in the island of Mauritius 300 years ago, but there is not one alive to-day in all the world, although we may see the skeleton of one at the great museum in London. It could not fly, because its wings were so small, and the dodo family was soon all killed. In New Zealand there used to be vast numbers of birds called moas, which were twice as high as the biggest man—as much as 14 feet high. There still lives a bird called the apteryx, or kiwi [see plate facing page 48], which, like the moa and the dodo, and the ostrich and the penguin, cannot fly; but, though it is a fair-sized bird, it is tiny compared with the moa. The great auk, which used to come in thousands to the shores of Newfoundland, is another bird which has died out within the last hundred years. There is not one in the world to-day, but there are a few of its egg-shells, and they are so rare that men pay hundreds of dollars for them.

Men have killed many birds and animals, but in making the world what it now is Nature has killed far more. Whole races of animals have been destroyed by earthquakes and floods, by the sinking of land into sea, and by snow and frost and ice descending upon lands where before all was sunshine and rich vegetation. Then, again, great families of animals have gradually died out, and given place to others better able to fight the battle of life.

Think of the horse, that swift and beautiful creature! Once upon a time, long before man appeared on the earth, the horse was a miserable little thing with five toes on its front feet and three behind, and only as big as a fox. The horse has, through a long number of years, become larger and swifter and more beautiful, and its soft, spreading toes have become hard hoofs.

BURIED ANIMALS

We know that huge monsters once lived, because when we dig deep down we find their bodies, like this, buried in the earth, where they have lain for millions of years.

Think, again, of the humming bird, that tiny beauty, not much bigger than a good-sized bee, and remember that it has descended from a monster called the iguanodon, which had a great head like a lizard, a yard in length. It had a great tail and enormous hind legs, with shorter ones in front; and when it reared itself upon its hind legs the height of its head from the ground was 14 feet. In many ways it was like a bird. Its front legs, it is supposed, had first been used as paddles to help it to swim. As time passed away these became changed into wings, with which it learned to fly. It lived on herbs.

There were others rather like it which ate flesh. One of these was a fearful creature called the megalosaurus, which fed upon the flesh of the great animals that lived on herbs. Another was called the brontosaurus, and a third was called the ceteosaurus. These monsters had bodies as big as the biggest elephants. Their legs were shaped like those of the iguanodon, except that the front legs were longer. The length of these creatures was as much as 80 feet; and their backs, when they were full grown, were quite 14 feet from the ground. All these creatures belonged to a family called the dinosaurs, which means terrible lizards.

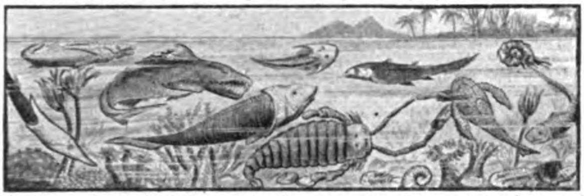
The sea, as we have seen, had wonderful creatures in those far-off days. The waters teemed with what we now call the great fish-lizards. One of these was the ichthyosaurus, which was 40 feet long. It had a wonderfully formed eye, which it could adjust so as to see things quite near or those far away. The remains of this creature are common in England, and scientists have been able to learn that though its home was chiefly in the water, it used to crawl on to the land to bask in the sun, as turtles and seals still do. The ichthyosaurus has died out, but the shark lives as a relic of those bygone times. The whale is a much younger creature.

The sloths, small animals to-day, which cling to the branches of trees and live upside down, are descended from enormous creatures which, instead of having to climb the trees to eat the tender shoots, were powerful enough to pull the tree down to their mouths!

WONDERFUL THINGS THAT LIVE ON THE EARTH WITH US

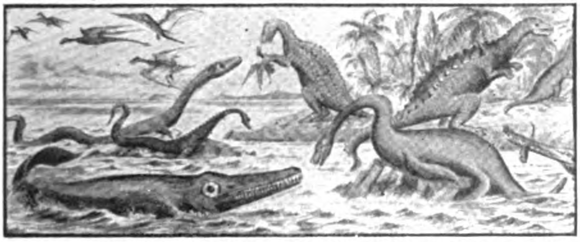
Their names are all given on the opposite page

These pictures show us some of the strange creatures that have passed away, and help us to understand the story of animal life from the first thing we know about it. Once all creatures lived in the sea, and the first of all were only soft things like jelly, with no bones.



These creatures had the sea to themselves for a very long time, and slowly they grew into separate families, unlike those which had gone before. Proper fishes began to swim about, and some of them lived in shells. Then on the land great forests grew, and a new kind of animals came.

The first crocodile appeared now, but this age is important because great trees grew, drinking in the sunshine for thousands of years, and then fell, to be buried in the earth, and to lie there millions of years until they turned to coal. That is how coal began.



In the sea great fish-lizards grew, four times as long as a man, some with necks like snakes. There were great sea-serpents, fish with skins almost like iron, and huge animals that could live either on land or sea.

Some of these creatures could fly and swim, and some could eat off tree-tops. The first birds came, and flying dragons. It has taken millions of years for these strange things to become the beautiful birds we know.

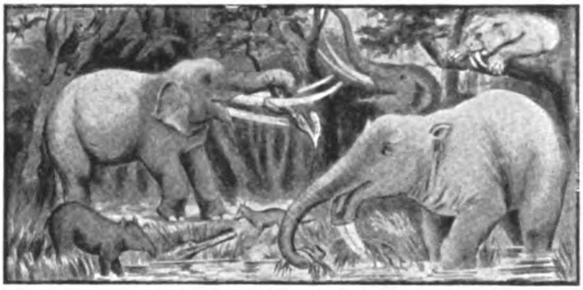
HOW THE ANIMALS CAME INTO THE WORLD

The bodies of these monsters were as big as elephants, and their front legs had enormous power. Similar to the great sloth was an animal called the mylodon, the remains of which have been found in a huge cave in Patagonia, along with the bones of other wild animals. It must have been buried there a very great time ago, for among the bones were those of animals now extinct. In this cave there were also the bones of dogs and men, with bones made sharp by man to use, perhaps, as dinner-forks; and here also was found a quantity of cut grass, which makes us believe that once upon a time savages kept the mylodon alive in the cave and fed it with grass, just as we feed cows and horses to-day.

Nearly all these extinct monsters made their home at one time in the United States. In those days the whole interior of the continent was covered with water, in which swam huge fishes and enormous reptiles, as well as smaller sorts. On the shores roamed tigers with tusks, lions bigger than any now to be found, great bears which lived in caves, rhinoceroses covered with wool, and herds of hippopotamuses. Scattered about the United States and Europe were gazelles, great wild cattle and little wild horses, beavers, raccoons, leopards, lynxes, and cats, such as are now only known as Egyptian cats. There were crocodiles and alligators in enormous numbers in the rivers, and wild hunting dogs and wolves in the woods and forests. We find remains of such things as these in quarries and coal-pits and in deep cuttings when railways are laid or where wells are sunk. Animals which can live now only in the coldest parts of the earth once lived in Britain, and animals which can live only in hot climates once lived here. From this we see how great have been the changes in the climate of this country in bygone ages, and this helps us to understand one way in which animals from time to time have come to their end.

These great animals, once upon a time, had the world to themselves. They were the masters of the earth. They disappeared in the ways we have seen, and in many other ways. Many of them were destroyed by the Great Ice Age, of which we read in the STORY OF THE EARTH, beginning on page 4, when the climate of a great part of the world was suddenly changed, and nearly all living creatures perished from cold.

All these things about the early world we learn from Nature's own storehouses, the rocks and bogs or frozen wastes in which the strange monsters of land and sea fell and died. The great fish-lizards are no more, the monstrous flying reptiles have gone. The gigantic birds are represented only by the ostrich and the emu. But there are still links with the puzzles of those old days. There is still an animal that flies—the bat; and there is still an animal which lays eggs like a bird, and has a beak like a duck. It is called the platypus, and it lives in Australia, where that strange animal the kangaroo, looking like some of the old-world freaks, is also to be found. The great sloth has come down to very small size, though some people believe that



On the land the great monsters were growing up, and the mastodon, like a giant elephant with four tusks, fought the savage tiger with teeth like swords. There were bats in those days, and a strange little animal walked the earth which we may, perhaps, call the first horse.

The little sloths we see to-day have descended from creatures like that clasping a tree on the right of this picture. The giant sloth lived when the hippopotamus and elephant began, when there were horses with many toes, and animals like tortoises bigger than a man.

Slowly the world grew into the kind of place it is to-day, and the animals became more like those we know. Bears lived in the caves, and the woolly rhinoceros and the savage hyena roamed the earth with the mammoth, like a giant elephant with long hair.

At last came man, the lord of all the animals. The first men lived in trees and caves, with the wild animals about them, and it has taken thousands of years for men to learn how to build houses, and tame animals, and make fires, and write books like this to tell us what a wonderful place the world has been, and how much more wonderful still it is to be.

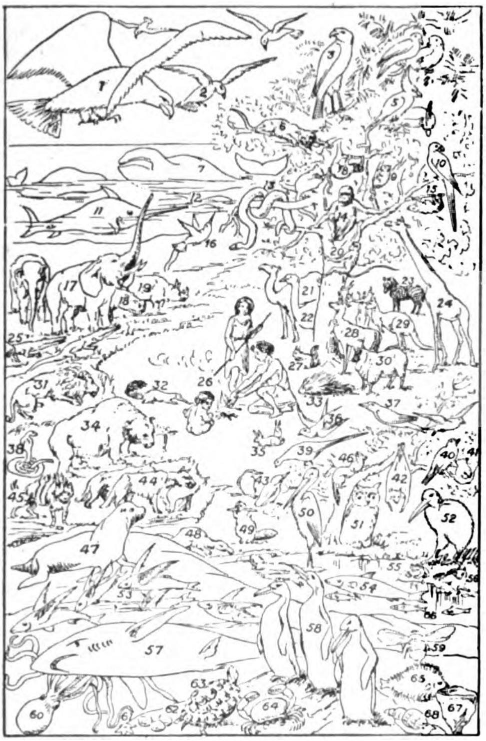
SOME OF THE GREAT MONSTERS OF THE PAST

there are still monstrous ones alive in Patagonia. The bats, with their wings and claws and mouse-like bodies, remind us of the curious things of old time, and the lizards and the armadilloes tell us of a time when their ancestors were among the marvels of the world.

What is the use of all these animals? That is what we often ask ourselves. All things really have their uses. The humble animals and birds and insects are able to teach human beings many lessons. A great man named Brunel, of whom we shall read in another part of our book, wanted to make a tunnel under the Thames. It was quite a new thing which he had to do. And how do you think he got the idea for the work? He watched a little worm burrowing its way into wood, building round itself a case of slime which became hard and firm, and making a tunnel that could not fall in. And Brunel made his tunnel under the river just as the worm made its tunnel through the hard woodwork.

THE NAMES OF THE WONDERFUL THINGS THAT LIVE ON THE EARTH

1 Eagle
2 Sea-gulls
3 Sparrow Hawk
4 Doves
5 Cockatoos
6 Tree Leopards
7 Whales
8 Lemur
9 Opossum
10 Macaw
11 Sword-fish
12 Dolphins
13 Python
14 Orang-outang
15 Sloth
16 Humming Bird
17 Elephants
18 Hippopotamus
19 Rhinoceros
20 Monkey
21 Camel
22 Ostrich
23 Zebra
24 Giraffe
25 Crocodiles
26 Man
27 Squirrel
28 Deer
29 Kangaroos
30 Sheep
31 Lion
32 Ant-eater
33 Porcupine
34 Bear



35 Rabbits
36 Swallows
37 Raven
38 Cobra
39 Pheasant
40 Thrush
41 Blue-tit
42 Bat
43 Kingfishers
44 Wolves
45 Hyena
46 Pine Martin
47 Sea Lion
48 Platypus
49 Beavers
50 Stork
51 Owl
52 Kiwi-kiwi
53 Flying-fishes
54 Salmon
55 Toad
56 Rat
57 Shark
58 Penguins
59 Bee
60 Cuttle-fish
61 Star-fish
62 Oysters
63 Tortoise
64 Crab
65 Globe-fish
66 Carp
67 Cup Sponge
68 Whelk

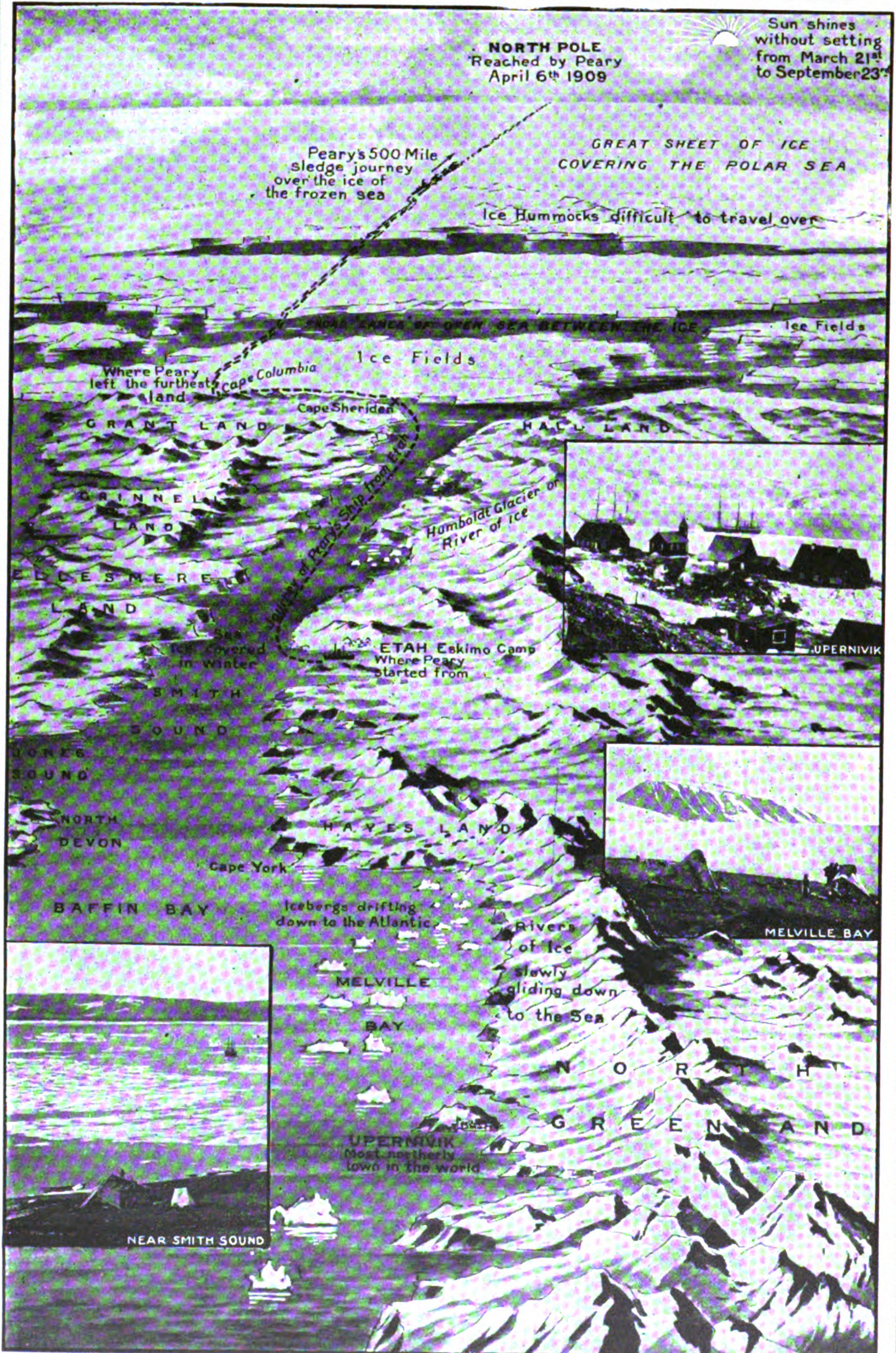
The coloured picture [page 48] shows 68 kinds of living things, from the jelly-fish in the sea to elephants and men. We do not see them in the proper size, but we can tell from the picture what a wonderful world of living things this is. No man has ever been able to count them all. By looking at the numbers in this picture, and then at the side numbers, you will be able to find out the names of the things in the big picture opposite.

There is nothing more ugly at the Zoo than the alligators and crocodiles. They are cruel creatures, and have to be killed when we catch them, because, when they can, they eat men. Yet we cannot afford to lose them, for they eat things which destroy the crops, and dead bodies of animals drowned in the rivers. If the alligators did not eat them, these bodies would poison the rivers. The great hippopotamus, also, eats the things which grow in the rivers. If he did not, the rivers would become choked with weeds, and boats would be unable to pass up and down.

So there is work for us all. Man has his work; so has the elephant in the forest, the hippopotamus in the river, and the tiniest insect that hums in the air. They do the work they are created for—to help to keep the world healthy.

The next animal story is on page 131.

PEARY'S ROAD TO THE NORTH POLE


NORTH POLE
Reached by Peary
April 6th 1909
Sun shines without setting from March 21st to September 23rd
Peary's 500 Mile sledge journey over the ice of the frozen sea
GREAT SHEET OF ICE COVERING THE POLAR SEA
Ice Hummocks difficult to travel over
BROAD LANES OF OPEN SEA BETWEEN THE ICE
Ice Fields
Ice Fields
Where Peary left the furthest land
Cape Columbia
Cape Sheriden
GRANT LAND
HALL LAND
GRINNELL LAND
Journey of Peary's Ship from Etah
Humboldt Glacier or River of Ice
ELLESMERE LAND
Sea ice covered in winter
ETAH Eskimo Camp
Where Peary started from
UPERNIVIK
SMITH SOUND
JONES SOUND
NORTH DEVON
HAYES LAND
Cape York
BAFFIN BAY
Icebergs drifting down to the Atlantic
MELVILLE BAY
Rivers of Ice slowly gliding down to the Sea
MELVILLE BAY
NORTH GREENLAND
UPERNIVIK
Most northerly town in the world
NEAR SMITH SOUND

After centuries of attempts, in which many lives had been lost, the world was startled by the news that Captain Peary had at last, on April 6, 1909, reached the North Pole, an achievement that he had been struggling to accomplish for years. Here we see the route taken, and the small pictures show points on the road to the Pole.

THE STORY OF GREAT LIVES

HAVE you ever thought, when looking through the window, that once upon a time there was not a pane of glass in the world? Then a man dug things out of the earth, mixed them, and made something hard, smooth, and clear, so that he could see through it; and it was called glass. Who was he? We do not know. But let us think of the great debt we owe him as we stand at the window and look out upon the world. And all through our lives let us remember that we owe more than we can ever pay to those who lived before us—to those who wrote books and painted pictures, who found steam and made railways, who found gas and lighted our houses, who made our roads, who gave us tools to work with; to the doctors who found out the secret of health, to the travellers who found new lands, to those who laid down their lives that we might live and know more and more. We shall read here of some of the greatest of these.

MEN WHO MADE THE WORLD KNOWN

By MANY WRITERS

ALTHOUGH millions of people live in America, nobody in this country is so stupid as to think that these are all the people there are, or that ours is the only country in the world.

We know that England, Scotland, and Wales are three countries joined together, with the sea all round them, but we know that away over the sea to the west there is Ireland, and right away still farther to the west, thousands of miles away, there is America, with twice as many people as Britain has. We know that crossing the sea to the East from England we reach Europe, and going forward, first over the land, then over the sea, we may get to Egypt and China and India, and the great lands of the East. Far down to the south, a very long distance away, we come to Australia and New Zealand, with all their people.

It does not seem a clever thing to know all this now, but once upon a time people in Britain thought that there was no other land but theirs, and no other people but themselves. Other people in different parts of the world used to think the same thing about their countries and themselves. They did not travel from country to country as we do now, so they could not get to know of far-off places and different peoples. When they did begin to learn that the world had many different countries, and many different peoples, they were as surprised as we should be if we suddenly discovered the air above to be full of islands and peoples. People living where the weather is always warm never dreamed that there were such things as snow and ice. Those who lived where the weather is always cold did not imagine that there were parts of the world where it is always summer, where oranges and grapes grow wild in the sunshine, where birds of paradise fly like living rainbows amidst the trees and fireflys dance like winged rubies in the glowing air.

The story is told in the CHILD'S STORY OF THE EARTH, on page 1, of how people used to think that the earth was flat. The people of those early times did not find it easy to make their way about the world, and to discover other countries and people. Still, little by little, they did learn their way about. There were people living all round the Mediterranean Ocean, and they began to spread about, and to find that the world was larger than they thought. There were wonderful people living in the north of Palestine called the Phœnicians. Their country ran along by the sea for a distance as great as that between New York and Boston, and they built tiny ships and began to explore this great sea. They made friends with King David and King

Solomon; they went to Greece and Spain; they even went to England. They found the way over land to India and China and Persia, and parts of Africa. Well, that had all been forgotten, and, hundreds of years later, Rome, so proud to think herself mistress of all the world, did not know that there was such a place as China! And China had never heard of Rome!

One day somebody brought news to the Court of China saying that far away there was another part of the world, with many rich people in it. The name of the place was not known, but China made up her mind to have the place, no matter what it might be called. A great Chinese general was sent with an army through the centre of the continent of Asia to conquer this unknown land; but he was taken ill before he could get far.

Centuries passed away, and Rome was conquered by barbarians, and then nearly all that had been learned was lost again. Stupid men, who thought nothing about learning, destroyed all the writings that they could, and so the world was divided off again much as it had been before, the people in one country knowing little or nothing about those in other countries.

Think what the world lost by this. If all the books in the world to-day were destroyed, and no more were printed for hundreds of years, people would not be able to read, and some day they would have to begin again to learn all that we know now. So, as that sort of thing *did* happen in the old days, and people went for hundreds of years without learning again what had been lost, we need not be surprised that Cæsar never heard of China, or that Shakespeare never knew that there was such a place as Australia.

We shall see in our stories of discoverers and explorers how the great heroes of old times found their way about the world, through strange, savage lands, and upon seas over which they had nothing to guide them. To enjoy the stories it will be better if we can have a map or globe of the world before us, because it is then easier to understand.

THE BOY WHO WALKED TO CHINA

Marco Polo and His Wonderful Adventures

It is a wonderful thing, but it was, to a great extent, the doings of a boy which set men exploring the great seas to find their way about the world. As we have already seen, men from time to time did go about, but as they made a secret of what they saw and did, their knowledge was of no service to the rest of mankind. Marco Polo was only a small boy of fifteen, and not very strong, when he set out on his travels through strange lands, among savage people, to find his way to China, but when he grew up, what he had seen and known was written in a book for all men to read. His tales of strange countries and peoples, and of the riches and splendours of other lands, made other men want to go where he had been. His book told them how he had got there, so they were able to go by the route which he had followed, but it also caused them to make up their minds to go by sea to the countries which he had visited.

Marco Polo did not go alone to China. He went with his father and uncle. He was born in Venice, and only the love of travel made them set out. His father and uncle had already been to China and back, and now they decided that the brave boy Marco should go with them. They had to go over mountains, and across terrible deserts, through hot burning lands, and places where the cold was terrible. Poor Marco was made quite ill by the hardships, but he got better and kept bravely on.

At last they came to China, where a great King, called Kublai Khan, was very pleased to see them. Marco grew up at the Court, and became a great favourite of the King. Marco learned to speak several languages, and was so clever that the king sent him as his ambassador to Cochin China, to India, and to other lands. Each time he came back, Marco was able to tell the King not only the answer to the message with which he had been sent, but all about the countries themselves: how the people lived, what their trades were, and what were the big cities and rivers and mountains wherever he went. The King had never had so clever an ambassador as this before, and he heaped riches on Marco and his father and uncle.

This strange picture is taken from a very old French book called "The Book of Marvels," and shows the great King, Kublai Khan, seated in a canopy on the backs of four elephants, as described by Marco Polo in the account of his travels.

Marco Polo, the first European traveller to China, who walked to China as a boy and grew up at the Court of the King.

At last the Polos wanted to return to Venice, from which they had been absent for twenty-three years. The King was very sorry to let them go, but at last consented, and they came back. Marco remembered all he had seen and learned, and afterwards he had it all written down. For long, people did not believe his story to be true. They could not think it possible that there were such great lands as China and India, with millions upon millions of people. And the talk of silks and jewels and beautiful foods and scents of which he told seemed just as untrue. But by and by, when men began to know more, they saw that there was some truth in this book. It set men studying and making bold plans for discovery. The great Columbus, who lived two hundred years later, was one of those who studied the book, and it helped him greatly when he was making up his mind to try and find India by sailing over the sea to it.

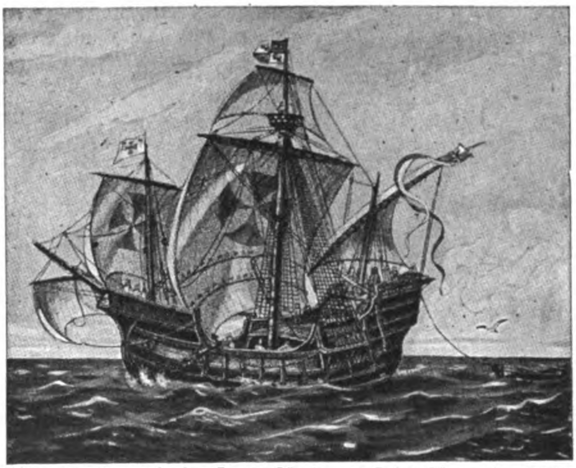
To show how hard Marco Polo found it to make people believe the account of his travels, we must read the story of what happened when he and his father and uncle got back to Venice. Nobody knew them. Nobody would believe that the little Marco Polo who had gone away as a boy had become a great traveller and come back a rich man. So the Polos asked their old friends to a great feast. First they appeared in robes of crimson satin; then they changed these for other robes, and at last they came into the room wearing the torn, soiled old clothes which they had worn in their wanderings. Their friends stared in surprise, and were still more startled when the three men cut open the patches of the old clothes and showed that these were filled with jewels. Then the people believed that the strangers really were the Polos, back from the far-off lands.

This is another quaint picture from the old Book of Marvels. It is meant to represent Marco Polo landing at Ormuz, a once famous city near the coast of Persia.

THE MAN WHO FOUND AMERICA

The Story of Christopher Columbus and His Discovery

CHRISTOPHER COLUMBUS did a greater thing than he knew. He thought that he discovered India; but it was not India which he found by sailing out over the great unknown sea. It was new land—America—though he died before the country was called by that name. Columbus never heard the name America.



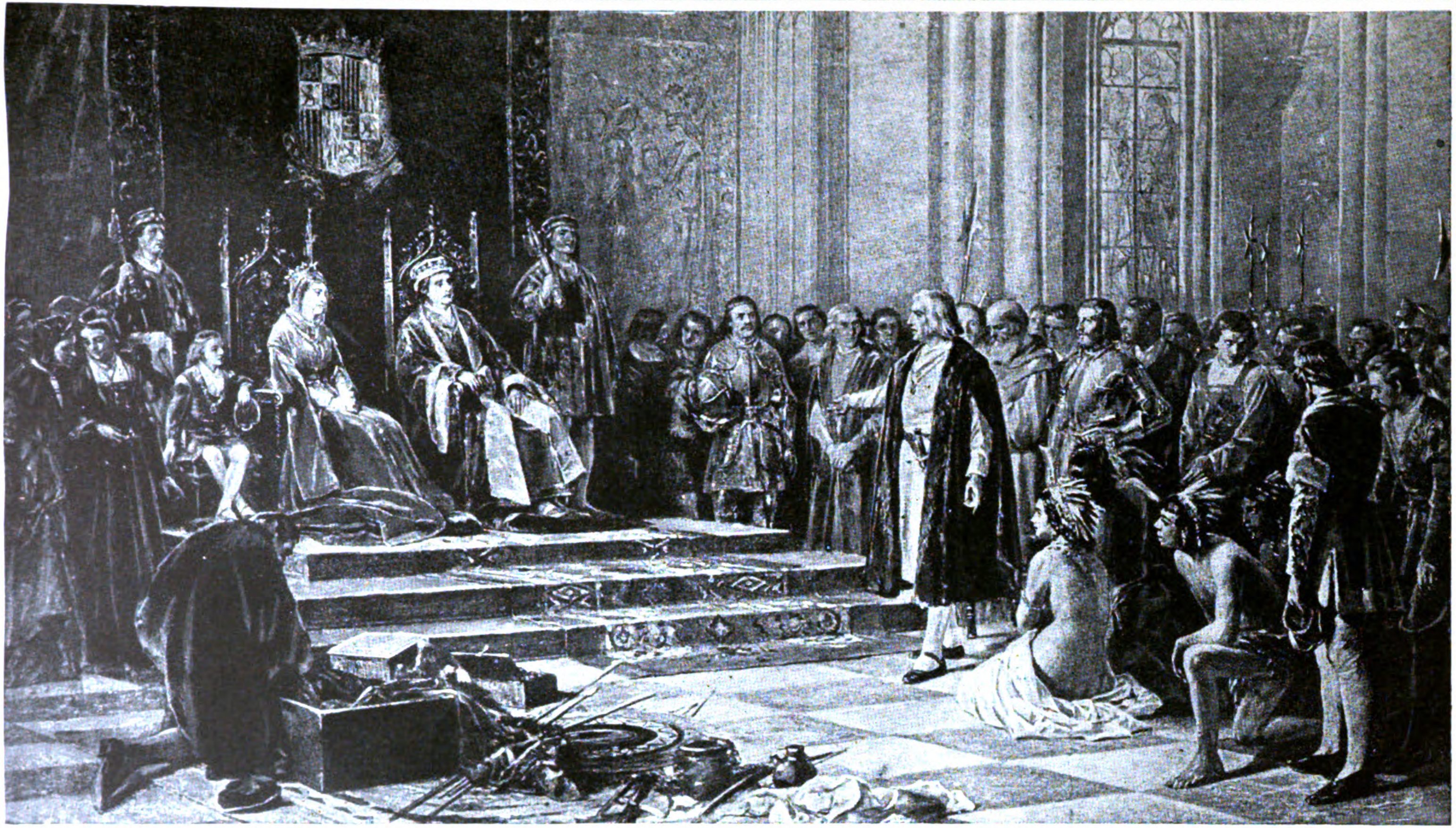
The ship, named the Santa Maria, or Saint Mary, in which Columbus sailed to America. It was from the deck of this ship that the New World was first seen by men from the Old World.

Columbus was very poor as a boy, but he was clever, and learned all he could about geography and travel. He was brave, too, and went to sea as far as ships commanded by other men could carry him. Once he was wrecked and almost drowned. Whenever he could, he read about Marco Polo's travels and other great adventures. He was born at Genoa, in Italy, and when he grew up he asked the rich people of his native town to provide him with a ship to go and look for new lands. For he did not believe that the earth is flat, as most people did at that time; he believed it to be round. He knew that India was far away at the back of Italy, where he lived, and he thought that it was part of a very great continent which reached far round into the sea on the other side of the world. And he thought that if he sailed out across the ocean to the west he would come to the western side of India.

Christopher Columbus, the man who discovered the American Continent, but thought it was part of India.

The people of Genoa would not have anything to do with such a scheme, so he went to Portugal and asked the king to help him. Now, this king was already sending out men and ships to explore the coast of Africa, and he thought there might be something in the plan of Columbus. But he was a bad, deceitful man, and secretly sent other men with a ship to do what Columbus had asked to be allowed to do. But the men on the King of Portugal's ship were cowards and turned back, frightened by the great sea.

When he heard what was being done, Columbus was angry and sad, and went away at once, and wrote to the King of England for help. Before anything could come of this, he went with his little son to Spain. and though the King of Portugal sent for him to go back, he would not. He went next to a Spanish duke, who could not help him, but sent him to King Ferdinand and Queen Isabella of Spain. Spain was at war with the Moors, and the plan of Columbus was put off from time to time, until at last he went away, heavy of heart, resolved to go to France. He was so poor that he had to stop at a monastery and beg for bread for his little boy. The monks took him in and were charmed with his strange talk. One man there happened to be a friend of the Queen of Spain. He wrote at once to her telling her how important was the plan of Columbus,



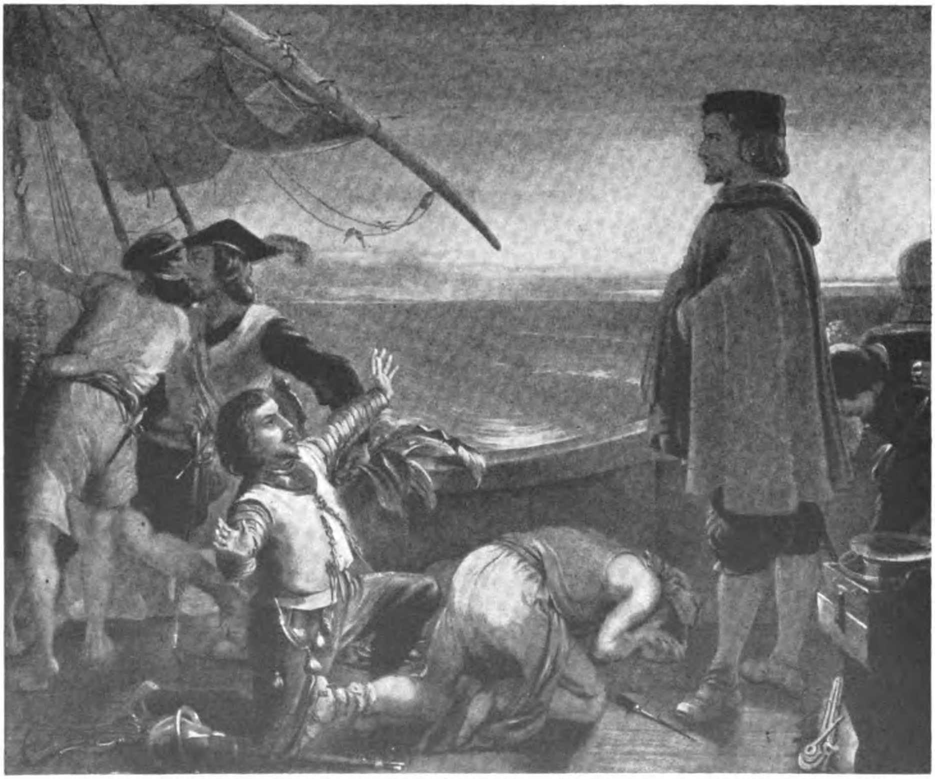
COLUMBUS BRINGING THE NEWS OF THE DISCOVERY OF AMERICA TO THE KING AND QUEEN OF SPAIN IN APRIL, 1493

Columbus began life as a poor boy, but he grew up to be received in triumph at the Court of a king. He had no encouragement to set out on his great voyage of discovery until the Queen of Spain pleaded for him. Then men and ships were lent to him, and he sailed to find America. This picture shows him in the palace at Barcelona, on his return from his voyage, telling the King and Queen of Spain of his discovery. It is strange to think that Columbus, who was so honoured by a king, died poor and lonely, as he was born.

and she sent for Columbus to go again to Court. But once more he was disappointed. He was kept waiting about the Court, the queen being engaged in games while the man who was waiting to discover the New World was sorrowing in neglect. He set off for France at last, and then the queen knew that he really was in earnest, and this time had him brought back, and caused three little ships to be fitted out for him.

He set sail on Friday, August 3rd, 1492, when he was forty-six years old. It was a strange and wonderful voyage, over an ocean which, so far as he knew, nobody else had ever sailed. His crews were terrified and wanted to turn back, and he had great difficulty in making them obey. They sailed on for two months and a week, and then, at ten o'clock on the night of October 11th, 1492, Columbus saw a light shining in the darkness. He thought that land was there, and next morning he found that he was right. There before them lay a beautiful island. Columbus dressed himself in his richest clothes, and, bearing the banner of Spain, he went on shore. There he made all his crew kneel down and bless God, and kiss the ground, and give thanks for God's mercies in bringing them to this place. Columbus then claimed the island for the King of Spain, and went on his way finding other islands. These islands he thought must be the western islands of India, because the East Indies were on the other side of the world. So he called them the West Indies, and called the people on them Indians. They were not Indians, but so they were called, and all the red men in America were called Red Indians for the same reason. It was America that Columbus had found, but he thought it was India.

He discovered another island, which is called Cuba, and a third, which he called San Domingo, now named Hayti. One of his ships was wrecked, so he took the wood from her and built a fort with it at Hayti. In this he left some of his men, and then returned to Spain. He



CHRISTOPHER COLUMBUS FIRST SIGHTING AMERICA IN THE YEAR 1492

Columbus, in his voyage of discovery, had often to keep up the courage of his sailors in sailing through unknown seas, as they grew discontented at times and wanted him to steer the ship for home again. When he saw the land he was in search of, his men, who had a little while before been in a mind to mutiny, grew shamefaced before him.

was received with great honours, and soon set out again for the West. He made more discoveries of islands, and still more in the third trip. Although he had done such a great thing, Columbus was made very sad by his enemies. Men were angry because of his success, and told spiteful and false tales about him. Once he was put in chains, like a common thief. He was very poor and very lonely when he died.

This is a portrait of Amerigo Vespucci, who proved that the land Columbus found was not India, but a separate continent, and after whom the land was named America.

America was the name given to the land after Columbus died. A man named Amerigo Vespucci explored the coast which Columbus had discovered, and found that it was not the coast of India. "It is a New World," he said. For a long time the land was called simply the New World, but at last it was decided to call it after the man who had found that it was not India. It was called America, after Amerigo, instead of after the name of the man who found it. America was discovered by Columbus in 1492. It was not named America until the year 1506.

FINDING THE WAY TO INDIA BY SEA

Vasco da Gama and the First Voyage Round the Cape

The people of Portugal thought that Columbus had discovered India by sailing to the west, so they made up their minds to discover it by sailing to the east. To do this they had to go from Portugal right down the west coast of Africa. Now, although a brave sailor named Diaz had discovered that the coast did not go on for ever and ever, and that there was an end to it, nobody had ever dared to go round the Cape of Good Hope, which Diaz had found. It took a hundred years of exploring to find that there was such a place as the Cape, for men were afraid to sail out into the open sea in those days; they kept close to the shore, and dared not go far beyond the place from which they started, for fear they should never be able to get back. But now King Emmanuel of Portugal fitted out three ships, and sent a nobleman from his Court to see what he could do.

This nobleman was named Vasco da Gama. His men were just as frightened as those of Columbus had been. But he kept on and on, and at last reached the Cape of Good Hope, and found that he could get round to the other side of Africa. Terrible storms seemed likely to swallow up his ships. His crew begged him to go back. "I will never go back until I have set foot in India," he said. Some of the men made up their minds to kill him, but he put these men in irons, and himself took command of the steering of the ship. They reached the Indian Ocean, and, sailing along the east coast of Africa, found great cities. At one of these they were able to get a pilot who knew the way across the waters. They reached Calicut, in India, at last, and tried to make friends with the King of Calicut. He was a bad man, and, after taking their presents, tried to kill them. They managed to return to Portugal, having found out one of the most important things in the world—the way to India by sea.

Vasco da Gama, the Portuguese explorer, who first sailed to India round the Cape of Good Hope.

THE FIRST VOYAGE ROUND THE WORLD

Magellan & Del Cano & How They Found the Pacific Ocean

THE first man to sail round the world was only a lieutenant. His name was Sebastian Del Cano, and when he set sail on the voyage he had for his leader the great Ferdinand Magellan. The ships went out from Seville to the west on September 20th, 1519, and returned from the east on September 8th, 1522, three years all but twelve days. But when they got back, instead of the five ships and 270 men with which they had started, they had only one ship and eighteen men. Del Cano was in command; the brave Magellan was dead. To understand what had happened we must go back a little.

Magellan, who discovered the Pacific Ocean, and died before his ship reached home again.

After the voyages of Columbus, the King of Spain still believed that India could be reached by sailing to the west. So he sent Ferdinand Magellan to seek the truth. Magellan was a Portuguese noble, who had left the service of his king because he had not been well treated in Portugal. He had already been in India by Da Gama's way, and had seen the famous Spice Islands. Now he set out to do what Columbus had failed to do—to reach India by the western passage.

Del Cano, who was Magellan's lieutenant in the first voyage around the world.

He struck out boldly for what we now know as South America. Nobody had ever been able to get to the end of it; nobody could tell whether it was possible to get round or through it. Some of his men rose in mutiny, and one ship left him because the crew were too frightened to go farther; but he would not give up. He explored all down the coast, and at last came to a great opening. He sailed up it, hoping it would go right through. No; it was only a great river. He came back, and went on until at last the coast seemed to break in two. He sailed in through heavy waves into a channel which ran between great precipices. He was the only man not afraid. His men almost died of fright when a great storm arose. He managed to calm their fears, and at last they got through the strange channel. And then a magnificent open ocean appeared before them. It was smooth and calm, and he called it the Pacific, which means the "peaceful" ocean. That is how the great Pacific Ocean was named.

He had come through a strait which he called after his own name. The Magellan Straits had shown him the way past South America. To get through it had taken him thirty-eight days, so it is not surprising that his men were afraid. He now sailed half-way round the world, and reached the Philippine Islands, where he was killed in a battle with natives.

It was when Magellan died that Del Cano, taking the only ship fit to sail on, continued the voyage, still in strange waters, but knowing that he was steering for home. He came back round the Cape of Good Hope as Da Gama had come round from India. When he got home people saw that, as he had gone out by one way and come back by another, the world really was shaped like a ball, and that Del Cano had been round it.

The Magellan Straits are still called after the man who found that they lead to the East. Many attempts were made to follow Magellan, and after fifty years Sir Francis Drake sailed round the world from England.

The next story of the discoverers is on page 117.

The Child's Book of Its Own Life

ALL ABOUT YOURSELF

THE greatest wonder in the world is Life. What is it that makes us move, and breathe, and feel? Nobody knows that. But there is a greater wonder still than breathing and moving and feeling. Even animals can do these things. What is it that makes us think, and love, and hate, and pray? Nobody knows. It is the world's great mystery, which no man yet has ever known. The world is a beautiful place filled with living things, and men and women and boys and girls are the masters of creation. We can measure the earth, and we know what the sun is made of, but we do not know the wonder of ourselves—what makes you YOU, what makes me ME. In this part of our book we shall be told all that we can know about the great mystery of Life.

LIVING THINGS AROUND US

By DR. SALEEBY

OF all the interesting things in our wonderful world none are more interesting than the living creatures we find everywhere around us.

They are our own friends and relations. If we think of the moon, beautiful but dead, a great splendid tomb, we shall see what a difference there is between the moon and our own earth, which is the mother of all living creatures. No doubt there were once living creatures on the moon, too. If there were no animals, there were at any rate some plants. But the moon has now grown cold; she has lost all the air that she once had such as our own earth has now; she has not even a drop of water left, and so all the plants that once lived upon the moon are dead now, they and their children. How different is the earth! Life fills the seas, covers the dry land, and flies in the air above. Everywhere there is life and movement, and birth, and death, and new birth; always and everywhere there is life and more life. These are the most interesting facts of the world we live in, and we must ask ever so many questions about them. For instance, what is the difference between a living thing—like a fly, or a rose, or a child—and a thing that is not living or that never has lived—like a stick, or a stone, or the gravel or clay in the garden? Then again, what are the different kinds of living things? How is it they are so different? An elephant is very different from a piece of moss, yet an elephant is much more like a piece of moss than it is like a piece of flint. How is this?

How can we tell whether a thing is alive or not alive? What is the difference between a living thing, like a boy or a rose, and a thing that is not living, like a stick or a book?

The business of our lives is to ask questions, to try to answer them, and to act and live in obedience to the answers; and after we have answered these questions, there remain many more to puzzle us. We know that living creature die, and yet life does not die; there is no living thing on the earth now that was alive 2,000 years ago, except, perhaps, a few great trees like the cedars of Lebanon, of which we read in the Bible. All the living things that were alive then—fishes and flies and birds and flowers—are dead now; and yet the earth is filled with life, and never was so filled with life before.

Why is it ? It is because of a very wonderful fact, the fact that all living things have children, and that these children are like their parents, and that when the parents die the children carry on their lives. There is an old Greek story of the runners who had to carry a flaming torch, and as one runner fell, tired out, he gave the torch to another; and so, though the runners fell, and could not reach the goal, the torch was not put out, but went on burning. The torch is like the flame of life, and each living creature is like the runner who runs for a little while, and hands on the flame of life to the children who will carry it on when he is gone.

Where have all these living things come from ? We know that all things, living and dead, have come from God, who sustains them from everlasting to everlasting. The questions for us are: How did all these kinds of living things come into existence ? What is their history ? Who were their parents ? It is only since the days when our grandfathers and our grandmothers were children that men have learnt the truth about this, and it is well for us that we have been born in the days when this truth and so many others have become known, for the more truth we know the better it is for our lives.

We will begin by asking ourselves this question: "How can we tell whether a thing is alive or not alive ?"

"Now that is really silly," you may say, because anyone can tell in a moment that the fly is alive and that the window-pane is not alive. We know that the fly is alive, just as we know that a little boy is alive—because he is so lively. We call anything alive that moves about itself, anything that jumps, or shouts, or swims, or flies. We say this, but is it true to do so ?

Really it is not true. When we come to think of it, the little boy is still alive even when he is fast asleep. He is just as alive when asleep as he was when he was playing before he went to bed. Some wise little child may say that this is not really a good argument at all, for even when the little boy is asleep he still moves, for we can see him breathing. Now that is quite true, for if we look at the sleeping boy, and then at the doll that may be lying in the same bed, we see that the boy's chest moves up and down, while the doll's chest does not; and if we put our hand to the boy's chest very gently we may feel his heart beating with our fingers. The heart has not gone to sleep; it is still moving, and it is moving because it is alive.

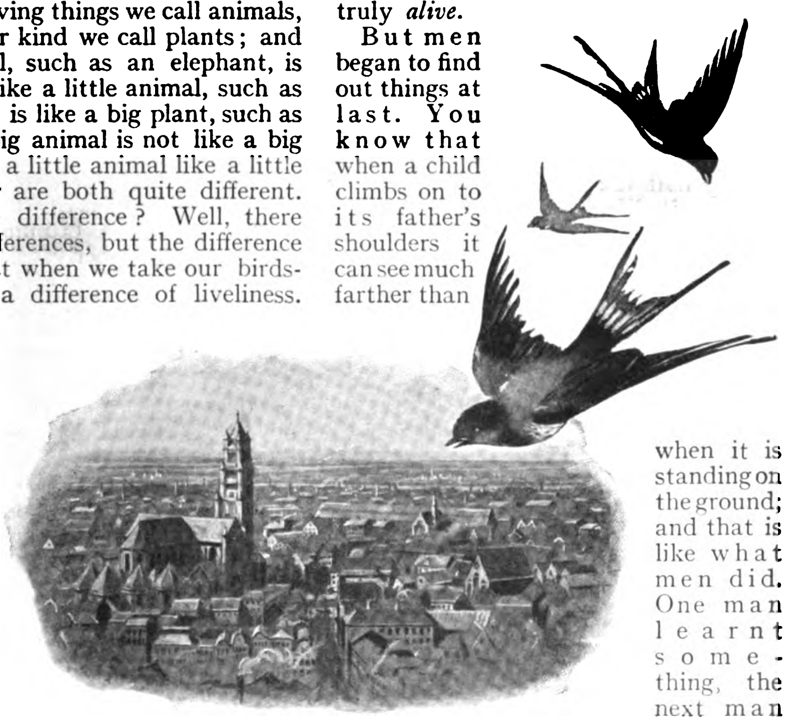
So that, after all, the boy is lively all the time, whether he is asleep or awake, and the real question is whether a thing which does not seem to move at all is alive like the boy. Must anything really alive be really lively like the boy ? We shall see.

There is an old story of the runners who had to carry a flaming torch, and as one runner fell, tired out, he gave the torch to another, who carried it and handed on the flame still burning. So every boy and girl carries on life.

We can imagine how a bird, flying high in the air, is able to look down upon the surface of the earth. If we have been up in a balloon we can understand what is meant by a birdseye view. A birdseye view is a view that the bird has of the world when it is up in the sky; it sees everything at once. Now, it is always necessary to take a birdseye view of anything that we are trying to understand.

If we take nothing but short views of one thing at a time, our ideas will be as silly as a fly's idea of an elephant must be. We must see one thing at a time, and all things together—we must take both sorts of views. Let us try, then, to take a birdseye view of living things.

When we do this we see that there are two great kinds of living things, and that they are very different from each other. The difference is not in size or quantity, but in kind or quality. The one kind of living things we call animals, and the other kind we call plants; and a big animal, such as an elephant, is much more like a little animal, such as a fly, than it is like a big plant, such as an oak. A big animal is not like a big plant, nor is a little animal like a little plant. They are both quite different. What is the difference? Well, there are many differences, but the difference we notice first when we take our birdseye view is a difference of liveliness. Animals move about themselves, and plants do not.



We must take a birdseye view of the world and of our lives. When a bird is high in the air it sees all the things at once, and we must try to take a birdseye view of anything we want to understand.

Shall we say, then, that plants are not alive? That has often been said and thought, because men thought that if a thing was to be called alive it must be lively. We know that plants are not lively, like a boy or girl; you can always find a rosebush where you left it in the garden, but the cat is not always where you left it. So men thought that because plants did not walk away they were not really alive.

And then men came to see the truth of what we have already said—that, after all, there is something about a rose which makes it more like a fly than it is like a piece of stone, even though the fly can fly and the rose cannot. So men thought that there were two kinds of life: one was real, true life, like the fly's life, or the tiger's, or yours, and the other was a sort of half-and-half life, not the real thing, but a kind of feeble imitation of it, just enough to make a difference; and men said that that kind of half-and-half life was shown by trees and plants. The men who said these things did not understand very much about them. They knew that there was something strange about the oak and the acorn, but they could not persuade themselves that anything which was not *lively* was really and truly *alive*.

But men began to find out things at last. You know that when a child climbs on to its father's shoulders it can see much farther than when it is standing on the ground; and that is like what men did. One man learnt something, the next man learnt a little more, and the man who came after him learnt a little more still; and so the world became wiser and wiser. We know to-day all that the men who lived before us knew, and we have also learnt something that they did not know; so that when our learning is added to theirs, it is as if we were standing on their shoulders and taking a wider view of the world than they were able to take. As men learned more about the world they were able to get a birdseye view, and the result of all their thinking is that we know now that plants are just as much alive as animals. In some ways plants are more alive than animals, even though they are not lively. The difference is that the life of the animal shows itself in liveliness, but the life of the plant shows itself in something else.

We know the animal is alive because it is lively, like the boy—like you. Your life shows itself in your liveliness. But we know the plant is alive because it helps the animal to live and to be lively, and for many other reasons.

Though the plant is very quiet and still, its life is very important, because it makes the liveliness of the animal possible For the animal lives on the plant, and, if there were no plants, all animals, even we ourselves, would die. It is very ungrateful for the animal to live by the life of the plant, to turn the plant's life into liveliness, and then to say that the plant is only half alive, or that its life does not really count.

Animals make a great noise, but plants do just as much work, only they do it quietly. We need not always be shouting and jumping, and barking or blowing a trumpet to prove that we are alive. Plants do none of these things, but their life makes all other life possible.

We know the kitten is alive because it is lively. The oak tree is not lively, but we know that it is alive because it grows. The same life that makes the kitten lively makes the acorn grow, first into a plant, then into a great tree, and we see from the oak tree that a thing may seem quite still and yet be alive.

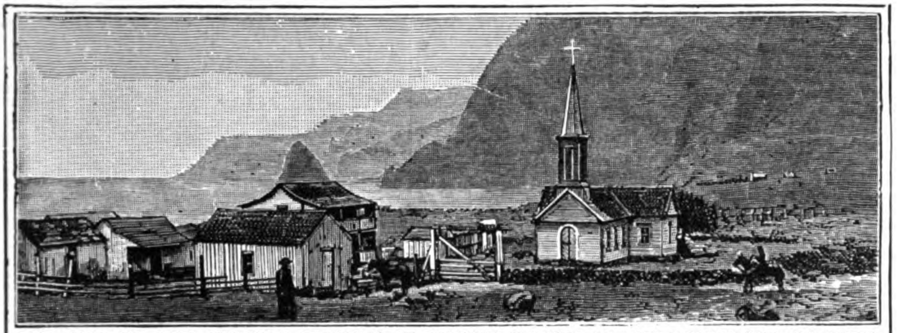
We see now that life means more than liveliness. Many things that are not lively are really alive, but all living things do not make a noise and walk about. You may look at a thing and never see it move for a day, or a week, or a year, yet it may be alive. Life means much more than the idea of something which moves by itself.

Movement is not really life, because *everything moves*. Plants do not walk about the garden, but they move by themselves. When the acorn grows into an oak, it moves upwards. When the sunflower faces the sun as it grows, it moves not only upwards, but in other ways also ; and if we take the leaf of a plant and look at it through magnifying glasses, arranged so as to make what is called a microscope, we can see for ourselves that the tiny specks of green stuff which give the leaf its colour are moving all the time.

Everything is moving. The old idea that liveliness is life and that nothing else is life is seen to be quite wrong and short-sighted, and not a birdseye view at all, because we find that everything moves, whether we can see it or not. The tiny specks of stuff that make up a pebble are always moving, and so are the black specks that make the ink on this page. If liveliness means life, then all things are alive, for all things are lively if only we see them clearly enough.

This is important to understand if we are to think properly of the life of the plant. Perhaps movement is the most important thing in the world, and perhaps if we could really see deep enough we should find that life itself is really a very special kind of movement or liveliness. But if life is just a special kind of movement, it is so very special that of course it makes all the difference whether a thing has this movement or not. The best way for us to understand what it is that really makes a thing alive is to study very simple kinds of life. The most simple kinds are plant life or vegetable life ; some are lively and some are not lively, but they are all alive. If there were no plants animals could not live. Plants are older than animals; that is to say, there were plants on the earth before there were any animals, and the first kinds of animals were the children of the first kinds of plants. These are only a very few of the reasons why we should study plants, without any silly idea that they are really not worth studying. If plants were not here to study we should not be here to study them. This is just one way of saying what we must always remember—that all living things belong to one another, and that unless they were always serving each other they could not exist.

The next part of this begins on page 167.



THE CHURCH AND MISSION STATION OF FATHER DAMIEN IN THE SOUTH SEA ISLANDS

THE SACRIFICE OF FATHER DAMIEN

Two brothers in Belgium were in the same college preparing to become priests. The elder brother was soon to become a missionary, and go away to the South Sea Islands. His eyes used to sparkle, and he would rub the palms of his hands together, smiling and showing all his teeth, whenever he spoke of the work that waited for him across the sea.

One day, however, he was taken seriously ill, and was carried to his bed. Fever wasted him. He fretted and grew pale and melancholy. His younger brother came to his bedside and said softly, "Would it make you happier if I took your place as a missionary?" The eyes of the sick man lighted up for a moment, and he squeezed his brother's hands, smiling. Then the younger brother wrote secretly to the authorities, begging that he might go in place of his brother.

As he sat at his books one day, the superior of the college came and told him that he was to go. The boy sprang up, rushed out of the room, and careered about the playground like a wild animal.

"Is he crazy?" asked the other students.

And why should Joseph Damien have been so glad to go into exile? Why should he wish to forsake the happy land where people spoke his language, and where all the customs and habits were so familiar to him? Why want to go and work among savages, far away out across the wild seas, unseen and forgotten by his friends?

Well, he had already given up the world to become a priest, and so it was clear that he was glad to become a far-away and forgotten missionary because he loved, more than the pomp of the world, more than the happiness of home, more than the love of father and mother, the Saviour who went about doing good, and who called upon all who loved Him to take up their cross and follow Him.

Joseph Damien, bubbling over with the excitement of a boy, started out for the South Sea Islands and became a missionary. He worked nobly and well till he was thirty-three. Then, while he was working among the people, he one day heard the good bishop say that, alas! he had no one to send to the poor lepers in Molokai, and that these poor, stricken creatures were abandoned to this most dreadful disease and to the most dreadful sins.

Joseph Damien, whose heart had often grieved at stories he heard of the lepers, begged the bishop to send him, and the bishop accepted his offer.

So here was another "giving-up," for to go from the savages to the lepers was a far greater sacrifice than going from Belgium to the savages. The lepers lived all by themselves, separated from healthy people, shunned by all mankind. They were outcasts. The dreadful misery of their bodies made them evil in their souls. Their hovels were like pigsties; they lived no better than beasts; they were horrible to look at and viler to know. You cannot imagine the horrors of Molokai. If I were to tell you a quarter of them, it would make you ill.

But Father Damien came to these outcasts with the simple message that God loved them; and his cheerful face, his caressing voice, his loving eyes, and, above all else, the living faith that was in his words, changed them from beasts to men, and presently from men to children of God. They began to be ashamed of their sins; they began to feel that perhaps God did really love them after all. One thing was true. Father Damien loved them.

For sixteen years this holy and devoted man lived among the lepers. He built them a church, which they loved, he built them better houses, he gave them a proper water supply, he nursed them, he dressed their frightful wounds, he comforted them when dying, and he dug their graves for them when they were dead. And people in the great world outside heard of this lonely priest toiling among the lepers. People wrote to him, sent him cases of comforts for his people, and some even came out to see him and help him. You will be glad to know that England honoured this Belgian priest, and helped him. In England his name became a power for good.

One day the warning came. He happened to spill some boiling water, which splashed upon his foot. He was surprised to find that it did not hurt him. He went to a doctor. "Have I got leprosy?" he asked. "I hate to tell you," said the doctor; "but, yes, you are a leper." From that moment Father Damien said in his sermons, not "my brethren," but "we lepers."

He was perfectly happy. He said that if he could be cured by forsaking the island he would not desert the lepers. So he worked on as a leper, with death creeping swiftly and fiercely through his body.

When he was carried to his bed, he thanked God for all the blessings and comforts he received. Two priests and Sisters of Charity knelt at his bed.

"When you are in heaven, Father," said one of the priests, "you will not forget those you leave orphans behind you?"

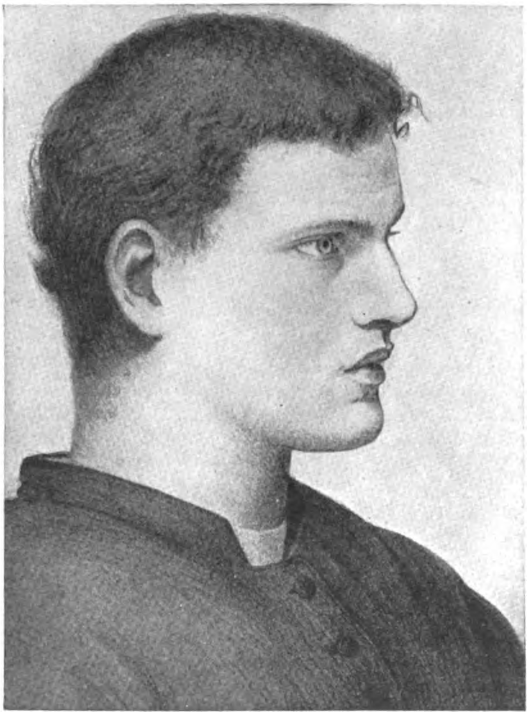
"Ah, no!" smiled the good Father. "If I have credit with God, I will pray for all in the *Leproserie*."

"And will you," whispered the kneeling priest, "like Elijah, leave me your mantle, my Father?"

"Why, what would you do with it?" asked Father Damien. And then he added slowly, "*It is full of leprosy.*"

What a fine coat to put off after one's life's work! No king ever wore a finer.

And soon the soul of Father Damien was received by the angels. His whole life had been a golden deed.



FATHER DAMIEN, WHO GAVE UP HIS LIFE

He went out from Belgium to help the lepers in the South Sea Islands. He left his own country and became a leper, giving his whole strength and at last his life to these afflicted people.

This portrait is by Edward Clifford, photographed by F. Hollyer.

THE FIRST GREAT BOOKS

ALTHOUGH almost every child is familiar with Lamb's Tales from Shakespeare, we are not to suppose that his are among the world's oldest books. Indeed, they are like stories of yesterday compared with others that exist in the world's great library. The oldest story that we know of is called "The Shipwrecked Sailor," and was written in Egypt 2,500 years before the birth of Jesus. The idea of Sindbad the Sailor may have been taken from it. But the oldest real books are the "Iliad" and the "Odyssey," supposed to have been composed by a Greek poet named Homer between 800 and 1,000 years before the Christian era. Perhaps he brought together the work of other poets as well as his own; certainly the great poems that bear his name were not all by one poet. The greatest Roman poet, Virgil, was born just 70 years before Christ, and his most famous work is the "Æneid." These three may be called the first famous books.

THE WAR FOR A STOLEN QUEEN

The Story of the "Iliad"

WE should know the meaning of the word "Iliad" before we can listen to the story. It is the English form of a Greek word that means "about Ilium," and Ilium was the name of a town that stood on the coast of Asia Minor. It is usually referred to in English as Troy, and it was the capital city of Troja; but it was known to the Greeks as Ilium. Its inhabitants were called Trojans. The "Iliad," which was composed by Homer, a Greek poet, nearly three thousand years ago, tells of a great war carried on by the Greeks against the Trojans, but what is true in it and what is the fancy of the poet we cannot very well say, as fact and fiction are mingled together.

The King of Troy was named Priam, and the name of his wife was Hecuba. Of their many sons, Hector was famed for his bravery and Paris for his good looks. It happened that Paris was sent on an embassy to Menelaus, King of Sparta, in Greece. This king was married to Helen, a woman so fair that she was thought to be the most beautiful woman in all Greece. When Paris arrived in Sparta, the king was away, and Paris was false to him. He made Helen a captive and carried her off to Troy. Greece, which is a land of many islands, was not then united under one king, but had many independent rulers and princes. So when the King of Sparta found that his queen had been stolen away, he called together a great meeting of the princes, and his own brother Agamemnon was elected "sovereign lord of all the Greeks" to lead them in a war against the Trojans for the recovery of Helen. At the marriage of Helen and Menelaus the Greek princes had promised to defend the beautiful Helen if any need arose.

The blind Greek poet who lived nearly 3,000 years ago and composed the "Iliad."

The story then goes on to tell us how the Greeks made preparations for the war, how the army was reviewed, and how the boats for carrying the soldiers were got ready.

It tells also of the many famous warriors who were to take part in the war. Chief among these was Achilles, the bravest of the Greeks; then there was Ulysses, the wisest; while Nestor was the oldest and most experienced of them all. When all was ready, the mighty army set sail for Troy, and, landing on the shore. soon laid siege to the city. For ten long years the siege continued, battle after battle was fought and also single combats between the leaders, but no decisive victory was won.

Thus nine of the years had worn away when trouble began among the Greeks themselves. A great quarrel arose between Agamemnon and Achilles over a very little matter—a slave who had been given to Achilles having been taken away by Agamemnon. As a result of this quarrel, Achilles withdrew to his tent, and would not support Agamemnon in any of the next skirmishes that took place between the Trojans and the Greeks. Growing bold, because the mighty Achilles fought no more, the Trojans now began to press the besiegers. Fearing that the Trojans might even score a victory, the noble Greek, Patroclus, the dearest friend of Achilles, dressed himself in the armour of that powerful warrior, and led the Greeks once more against the Trojans. He drove them back into their city, but fell, mortally wounded.

Achilles was the bravest of the Greek soldiers who fought in the war against the Trojans.

Achilles had now more reason than before to make war against the enemy that had killed his well-loved friend. Arrayed in a new armour made for him by Vulcan, he goes forth to avenge Patroclus, and is met by Hector, the finest fighter of all Troy. Now takes place the greatest battle of the long war. Hector soon falls before Achilles in his wrath, and the body of the Trojan prince is dragged three times around the city at the chariot of his conqueror before it is given to Hector's father, Priam, who bears it back within the walls of Troy, where the dead hero is mourned by Hecuba, his mother; by Andromache, his wife; by the captive Helen, and by all the Trojans. A great funeral is given to the hero of Troy:

"Perform, ye Trojans! what the rites require,
And fell the forests for a funeral pyre;
Twelve days, nor foes nor secret ambush dread;
Achilles grants these honours to the dead."

Thus commands Priam, the king, and with a short description of the final honours paid to the dead hero the story ends. But this, of course, was not the end of the war. The chief purpose of Homer's great and lengthy poem is to show what Achilles did during the siege of Troy, and not to give a complete account of the war.

THE STRANGE ADVENTURES OF ULYSSES

The Story of the "Odyssey"

After the Trojan War the Greeks returned home, but Ulysses was fated to wander for many years before he regained his native land, and the "Odyssey" contains the stories of his adventures during those years. The Greek name for Ulysses was Odysseus, and so the word "Odyssey" means "about Odysseus."

Ulysses was a princely soldier of Greece, who wandered by sea and land for many years after the Trojan War.

When the Greeks set sail from the coast of Asia Minor to return to their own beautiful homes, none of the princes was more anxious to regain his native land than the wise and brave Ulysses. But, in spite of all that his sailors could do, adverse winds drove his ships far from the isles of Greece. At home his wife, Penelope, and his son, Telemachus, were waiting for him, but they had to wait for ten long years after the Trojan War, and during those years the wanderer had twenty adventures. We can only mention a few here.

Instead of being carried towards Greece, the ships of Ulysses were blown along the coast of Asia Minor, and, being sore pressed by hunger, he and his men at length were forced to land and attack the inhabitants of a small town, who fled before them. The Greeks, with plenty to eat and drink, gave themselves up to merry-making. Meanwhile, the inhabitants came back and attacked them, slaying more than half of the sailors who had landed. The others had a narrow escape in returning to their ships.

Ulysses and his men who thus escaped landed afterwards on the island which we now call Sicily, and here they wandered about until they came to a great cave. In this cave were huge pans of milk, and the place showed other signs of being inhabited. It was, indeed, the home of one of the fabulous giants who, like all the gods and goddesses of these ancient stories, existed only in the imagination of the people of that time. The giant was named Polyphemus, and an uglier or more cruel giant it would be difficult to imagine. He had only one eye, and it was set in the middle of his forehead. He was chief of a race of one-eyed giants called Cyclops.

By tying each of his men below a giant sheep, after he had blinded the giant, Ulysses and his followers thus escaped from the cave when the blind giant drove the sheep out in the morning.

Ulysses and his men were waiting in the cave that evening when the giant came home, driving before him into the cave a flock of giant sheep, and rolling before the entrance a stone which twenty ordinary men could not have moved. To him Ulysses came forward and, offering a skin of wine—for in those days bottles were made of skins—pleaded for mercy to himself and his men. The giant drank the wine and was delighted with it. He promised a boon to Ulysses for his gift; but as he immediately proceeded to eat up two of the Greeks, it was clear they could not hope for any mercy from this monster.

After his long years at Troy and his many adventures, Ulysses returned safe to his wife, Penelope, and his son.

Polyphemus then asks Ulysses to tell him his name; but the prince is too wise to let him know who he is, so he replies:

"No-man is my name.
By that distinguish'd from my tender years,
'Tis what my parents call me, and my peers."

The giant then: "Our promis'd grace receive,
The hospitable boon we mean to give:
When all thy wretched crew have felt my power,
No-man shall be the last I will devour."

Six days of terror pass by, and the giant each evening reduces the followers of Ulysses by two before the wise prince hits upon a way of escape. On the seventh night, while Polyphemus lies stretched upon the floor asleep, Ulysses sharpens a great stake of wood, and, assisted by his men, this is run into the eye of the giant, whose roars of pain awaken others of the fabulous inhabitants of the island, but they cannot enter owing to the stone that blocks the cave. So they call to their great chief to know who hurts him, and from his den he answers:

"Friends, No-man kills me; No-man. in the hour
Of sleep, oppresses me with fraudful power."

To this they call back:

"If no man hurt thee, but the Hand Divine
Inflict disease, it fits thee to resign."

Then they go away and leave him. But all the Greeks together are unable to move the stone, and so they have to wait till dawn, when the giant himself, now blinded, pushes the stone away to let his flock of enormous sheep go forth. He himself sits by the entrance, meaning to prevent the Greeks from escaping. But Ulysses has been wise enough to expect this, and has had one of his men bound under each of the sheep, so that as the animals pass through the door they carry all the Greeks with them. Ulysses and his crew escape to the ships, and so ends the third of his wonderful adventures.

A stranger adventure still befalls the Greeks when, in their wanderings, they come into the hands of a witch named Circe, who gives them wine to drink that turns them into beasts. Here, again, Ulysses is too wise to be caught by any snare, and refuses to drink the wine. It is well for him that he does, as his wisdom makes the witch admire him, and for his sake she restores all his companions to their natural shapes.

Many of the adventures of Ulysses are full of meaning for us, and teach us valuable lessons if we care to take them. One of the most interesting is the adventure of the Sirens, who are beautiful singing maidens that sit along the shore and sing so sweetly that sailors are tempted to come to land. But these Sirens are really furies, who kill the men that land, and strew their bones along the shore. Here, again, the wisdom of Ulysses secures the safety of his crew. He puts wax in the ears of his sailors so that they may not hear the singing of the Sirens. and thus they row safely past their land.

Their next adventure is the sailing between a rock called Scylla and a terrible whirlpool called Charybdis, which Ulysses succeeds in doing. But we must now come to the end of these extraordinary adventures and see Ulysses landed safely on the barren shores of Ithaca, the Greek island of which he was the king.

Twenty years have passed since he first sailed away to take part in the great war against the Trojans, and all this time his wife, Penelope, who is famed for her goodness, her beauty, and her wisdom, has been patiently awaiting his return. Many other men have been anxious to marry her, and have come to the palace, saying, "Ulysses is dead, or he would have returned ere now." But she has refused them all, telling them she would never wed again until she had woven a shroud, and as she undid each night what she had woven during the day, the shroud was never made.

When Ulysses reached his palace, some of the princes who wished to marry Penelope were there. Nobody but his old nurse and his dog knew the king, who was so changed in his twenty years of wandering. But Ulysses told his son, Telemachus, who he was, and together they killed the princes who had been annoying Penelope. Then Ulysses sought his wife, who at first could hardly believe it was her husband back again, but at length was overjoyed to think her wise and noble king was safe at last and all his wanderings done.

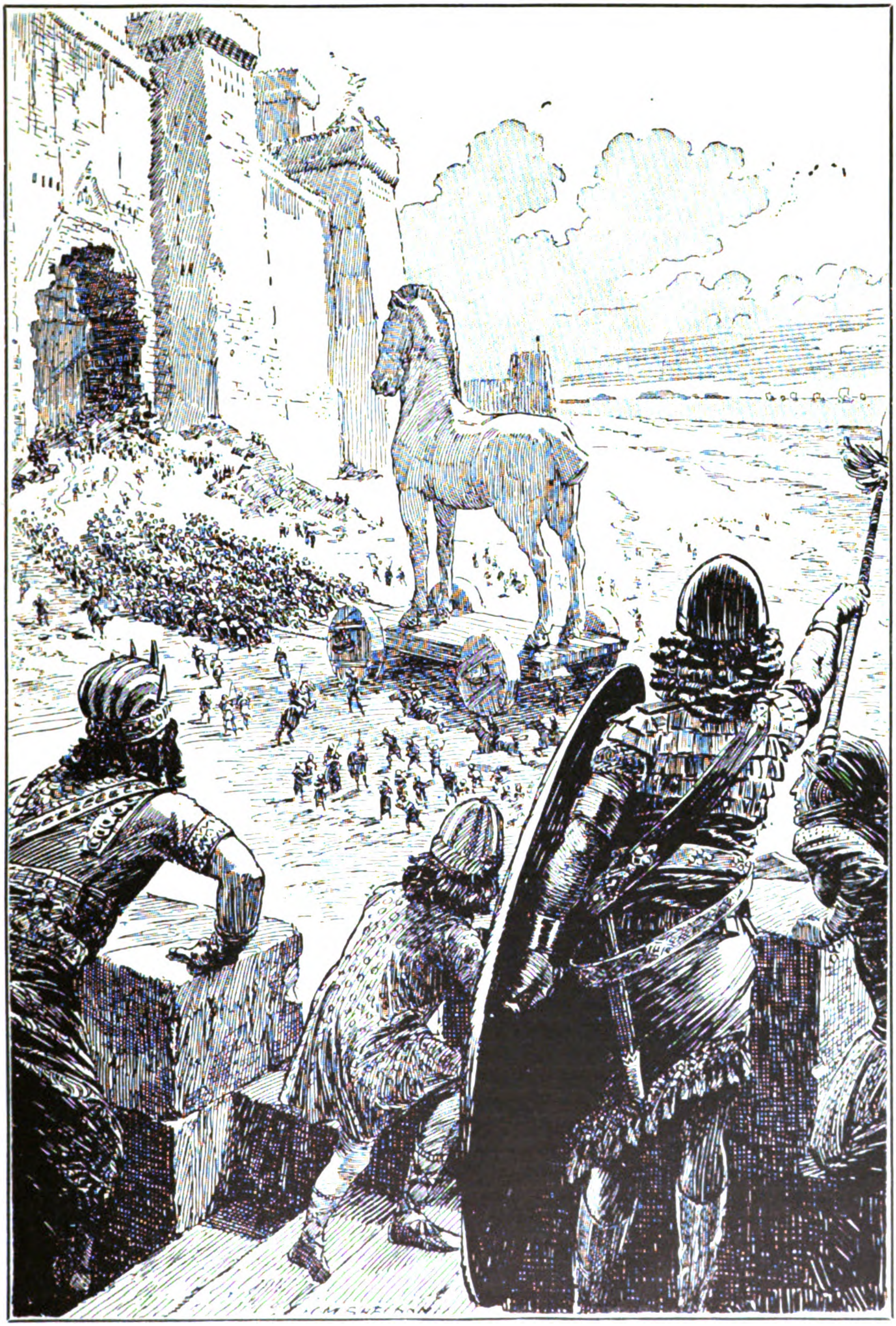
THE VICTORY OF THE WOODEN HORSE

The Story of the "Æneid"

Among the Trojan princes who took prominent parts in the great war there was one named Æneas, and nearly eight hundred years after Homer had written those two great poems in praise of Achilles and of Ulysses, Virgil, the Latin poet, followed the style of Homer by composing the great poem known as the "Æneid," which means "about Æneas." The real purpose of this poem was to please the Latin people and their rulers by showing how their kings had descended from this great Trojan prince, the story of whose life had ceased to be true history, and had become, for the most part, pure fable.

We have now to learn how the Greeks succeeded in destroying the city of Ilium, or Troy. It was due to the wisdom of Ulysses that the long siege ended in victory. He it was who caused an enormous wooden horse to be built, and inside of this were concealed a number of Greek soldiers. This very strange erection was wheeled to the gates of Troy and left there. Then all the other Greek soldiers got into their boats and pretended to row away, as if they were tired of the war. The curiosity of the Trojans got the better of them, so they went outside and, at great pains, drew the wooden horse within the walls of the city. In the night the Greek soldiers inside of it crept out and took the Trojans by surprise, while the main army, which had made a pretence of going away, came back and joined in the siege. Troy

THE STRANGE WOODEN HORSE OF TROY



The Trojan War was ended, after ten years, by Ulysses. The Greeks built a huge wooden horse, hid a number of soldiers in it, and pretended to sail away. The Trojans came out to draw the horse into their city, and, finding the gate too small, broke through the wall. In the night the Greeks returned, and their friends came out of the horse and opened the city gates while the Trojans slept. So the Greeks captured the city.

was soon in flames, its inhabitants killed or flying for their lives. The beautiful Helen, who was the cause of all the trouble, was restored to her husband, Menelaus, and so the famous siege was at an end.

The story of the " Æneid " does not begin by telling us this, but opens with the description of a terrible storm which overtakes the fleet of Æneas, who, after the fall of Troy, from which he had escaped, carrying his father on his back, but losing his wife, had gathered together many followers, and put to sea, setting sail, after seven years, for Italy.

In this great storm many of his ships are wrecked, but his own boat and six others arrive safe at an African port, and he finds himself in the rich and wonderful region of Carthage, to whose queen, the lovely Dido, he tells the story of the fall of Troy and the wooden horse which we have just heard. He also describes his different voyages after his escape up to the time of coming to Carthage. Dido herself grows to admire this noble prince and wishes to marry him, but he is warned to leave Carthage, and no entreaties of the queen will make him stay. In her despair at this she kills herself.

Priam was the King of Troy, and after the Greeks got into the city by the trick of the wooden horse, as told on page 71, Priam and many of his princes, as well as most of the Trojans, were killed by the victors.

After sailing to Sicily, where he celebrates the memory of his father, Æneas is supposed to visit the Elysian Fields, where the ancients thought the souls of people went after death, and there he finds his father, who shows him the race of heroes that is to descend from Æneas and is to rule over the Latin people.

Æneas sets forth, and reaches the land of Latium, or Italy, whose king, Latinus, entertains him well, and promises him his only daughter, Lavinia, heiress of the crown, as his wife. But another prince, named Turnus, King of the Rutuli, a Latin people, is in love with her, and is favoured by her mother. So war is declared between the Trojans and the Rutuli, in which there are many stirring battles, and towards the end it looks as if the Trojans might be completely defeated in the absence of their leader. But Æneas, who has received a shield made by Vulcan, the fabled god who made the armour of Achilles, on which shield are shown the future glories and triumphs of the Latin, or Roman, nation, returns to the field in good time to change the fortunes of the war.

In the last battle of all a single combat is arranged to be fought between Æneas and Turnus, but the followers of the latter succeed in wounding the Trojan prince. Æneas, however, is cured of his wound by his mother, Venus, one of the goddesses the ancient Romans believed in, and, forcing Turnus to fight a duel, succeeds in killing him.

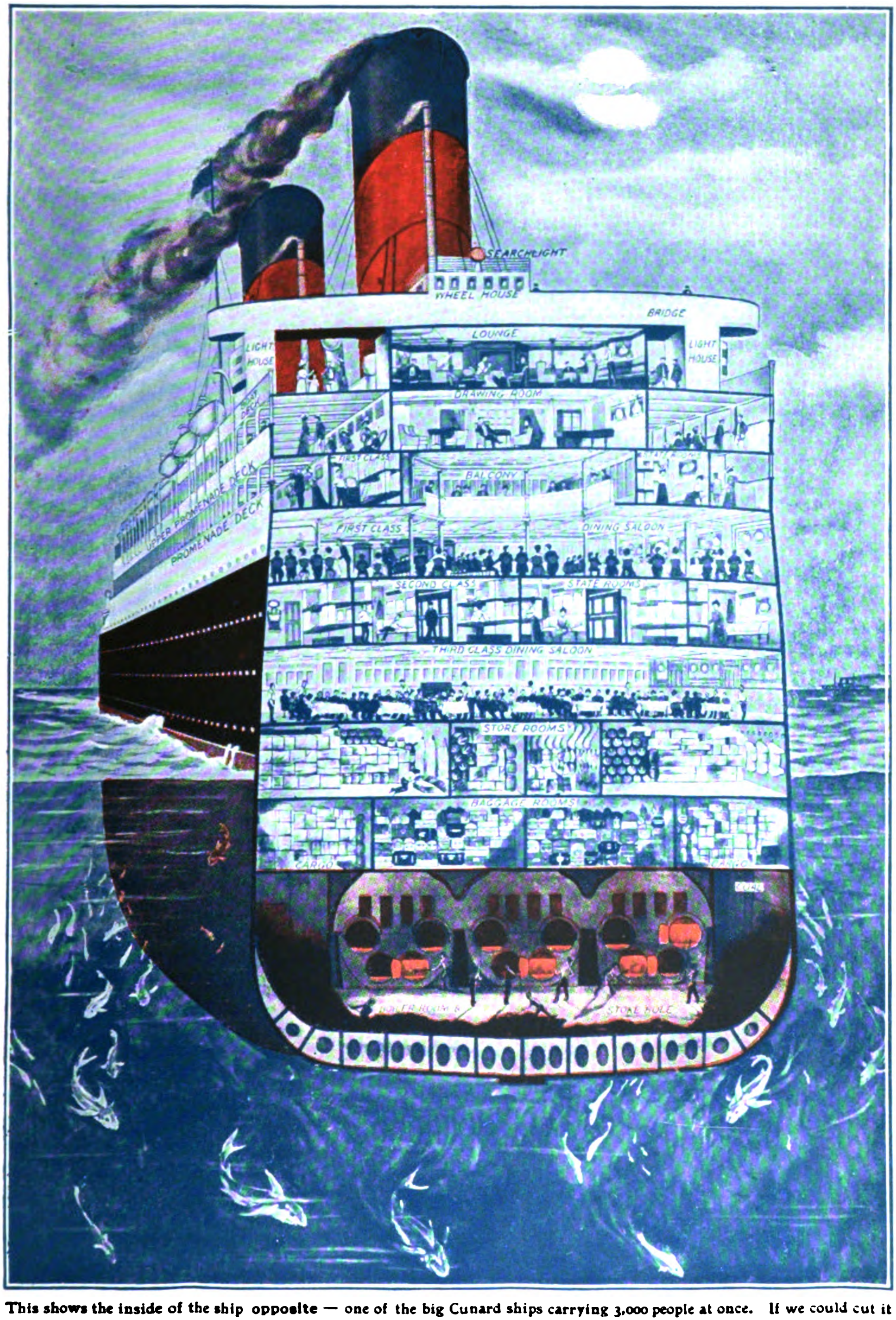
So ends the story of the mighty deeds of Æneas as told in the " Æneid."

The next story of famous books is on 177

THE WONDER CITY OF THE WAVES

The passing of a ship at sea in the full light of the moon is one of the most impressive sights that we can see. The great ship seems to speak to us of the wonderful power of man as it sails along the waves with thousands of people on board. The turning over of this leaf will give us a glimpse of these people on board, living as happily as if they were in their own homes.

THE INSIDE OF THE GREAT SHIP BY NIGHT



This shows the inside of the ship opposite — one of the big Cunard ships carrying 3,000 people at once. If we could cut it in two as we cut an apple, this is how it would look as it rides over the sea at night. It has ten floors. The captain's deck is at the top, with three decks below to walk on. Four times round one of these decks is a mile. Lower are the dining and drawing rooms; then come the sleeping-rooms, called state-rooms. Below is the baggage, and at the bottom, with the sea beating against its walls, is the engine-room, with the great fires and boilers which give the ship its awful power.

WHAT THIS STORY TELLS US

THE sea is one of the busiest places in the world. Every day there are thousands of ships at sea, full of people and things—men and women and children, and animals, and goods of all kinds. All the food that comes into our country must come over the sea, and some of the ships that bring it are many weeks on the way. If we go to India we live on the sea for weeks, and for a long time we may never see land. But the good ship carries us safely through the water, with music, and food, and friends, and toys, and beds, and all we want on board. This story tells us how the ship rides on the sea, like a floating town.

THE HOUSE UPON THE SEA

CONTINUED FROM PAGE 20

IT is wonderful to read in the story-books of giants carrying us about the world, over the hills and far away. It is more wonderful to know that in real life there are giants who do things just as wonderful. The steamship is more wonderful than all the giants in the fairy tales, for the steamship is a giant that carries thousands of people. Suppose there are five people living in your house, and you all want to go to Europe. Well, two hundred families like yours from the same village, and two hundred families more from a second village, and two hundred more families from a third village could all go to Europe by the same ship.

That would be three thousand people, as many as live in a small town. But that wouldn't matter. The ship could carry them all at one time, and take their trunks and boxes, too. Instead of being in a city on land, you would be in a city on the sea, racing across the water faster than the fastest horse can run. You would get to Europe in less than a week. There would be no need to take food with you. The ship carries food and drink ; it carries beds for you to sleep in, baths for you to wash in, books for you to read, cows to give you milk, hens to lay eggs for you. It has a telegraph office without any wires, from which, while still at sea, you can send a message to your friends on land.

For itself the good ship carries thousands of tons of coal and thousands of gallons of water. It must carry water wherever it goes, to make the steam which drives the ship, because the water in the sea is salt. If that salt water were boiled to be turned into steam, it would leave the dry salt behind, and choke the boilers. So the ship has to carry fresh water, which has no salt, or else it must have a machine to remove the salt from the sea-water, and boil the water after the salt is gone.

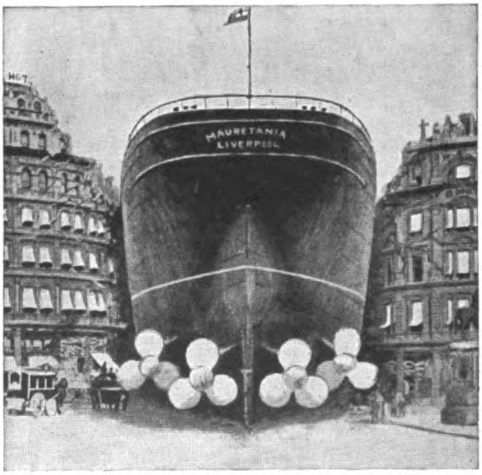
This great ship carrying so many people and such heavy machinery is made to ride across the sea by the strongest giant that works for us. That giant is *steam*. It is just the same sort of steam which you see coming out of the kettle, only that which drives the ship is made hotter than that which curls out of the kettle-spout.

A hundred years ago people would have thought a steamship a very, very wonderful thing. In those days they did not travel by steamships. There were no such things then. When a boy sees a pond, he likes to get a big piece of wood and make a raft, so that he can ride on the water. That raft is as good as the first boats which, long, long ago, men had to use. If they wanted to cross a lake or a river, they had to float across on an old log.

When men got to know more about making these things, they used to scrape out the inside of the log, so that they could ride inside, and not have their toes bitten off by crocodiles. Then they made better boats, and found out that they could make them go faster by using sails and oars. The oars are long pieces of wood, with flat ends, which dip in the water, and when pulled through the water they make the boat go along. The sails are blown upon by the wind, and the wind drives them along, carrying the boat with them.

But for a long time men did not become much cleverer in making boats. They made them larger, but they had to use oars, or trust to the wind to drive them. When they made very big ships they could not use oars, so then they had only the wind to help them. When the wind did not blow the ship stood still, or was carried along by the water, perhaps where they did not want to go. Nelson's ships were all like this.

It took a long time for men to learn how to make a ship go by steam. Some men tried to do it, but people did not believe that it could be done, and would not help them. Many men tried and failed, and died broken-hearted. More than a hundred years ago a little ship was made to go by steam along the River Clyde, in Scotland. It pulled barges which were too heavy for horses, but people would not believe that it was any good, and that little ship was cast aside and neglected until it fell to pieces.



How a ship would look in a street. The curious things behind are the screws which drive the ship through the water. The engines turn the screws round, and as they turn they push away the water and move the ship forward.

Years after, a ship driven by steam went across the Atlantic Ocean to England. Everybody said that this was wonderful, but they did not think it could always be done, so nearly twenty years more went by. Then a clever man named Brunel built a ship called the Great Western. It was driven by steam, and went from Bristol to New York in a fortnight, while the ships driven by wind took at least a month. Since then thousands of steamships have been built, and now we can get to England in five days.

What is it that this wonderful steam does? Well, deep down in the bottom of the ships men burn great heaps of coal. The coal makes big fires in the furnaces, and turns the water in the boilers to steam. This steam is so strong that it drives the machinery of the ship; then it is cooled and turned back into water, and boiled up again to make steam once more. All the machinery of the ship is worked by this giant. At one end of the ship is a screw with three long blades. The steam turns this screw.

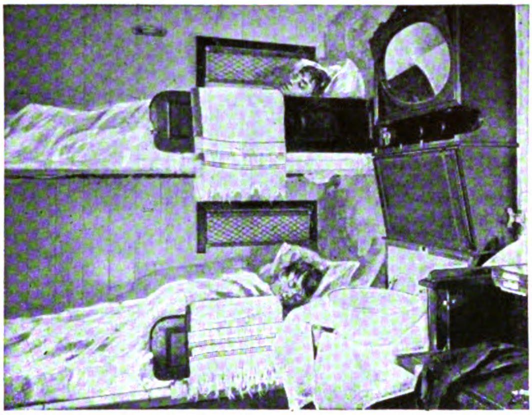
When you twist a screw against a piece of wood, the screw makes its way into the wood, turning round and round and going forward. That is what the screw does when the steam makes it go round in the water. The water is all round the screw, and when the screw twists round, the water resists—that is, the water tries to stop the screw so as not to be pushed out of its place.

By resisting, the water becomes like wood, and the screw eats its way forward through the water, and so makes the ship go. The faster the screw turns round, the faster the great ship travels, so that we have a ship weighing 50,000 tons riding along as smoothly as a cab, but so quickly that it can go a mile in two minutes. The wind may be blowing the way the ship goes, or against it; it does not matter to the ship. The great giant steam sends the ship the right way.

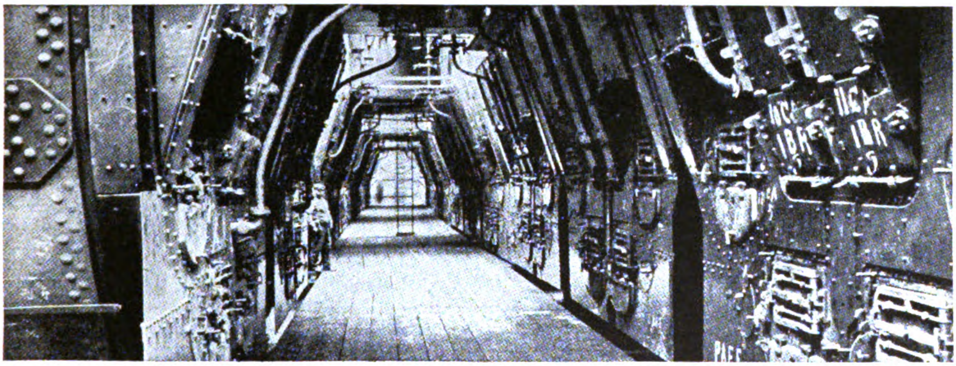
Many men work on these ships—sometimes 500 on one vessel. The hardest work is that of the stokers, who look after the fires. When you go on to a ship, you see people playing games on deck, or having dinner below, or reading in the library, or resting in the little cabins. And right down under them all are the men keeping up the great fires. Only an iron plate or so keeps the sea from these men, so deep down in the water are they. The heat is so great that cold air from above has to be pumped down by electric fans.

WHAT IT IS LIKE ON BOARD A GREAT SHIP

Every great ship has a doctor on board, and in his surgery he works as if he were on land.

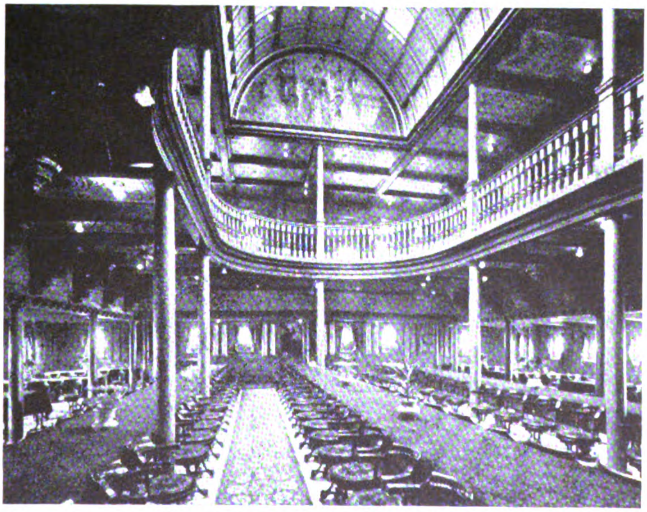


Little children sleep as soundly on the sea as if they were in bed at home. The beds are fixed one above the other in small cabins.



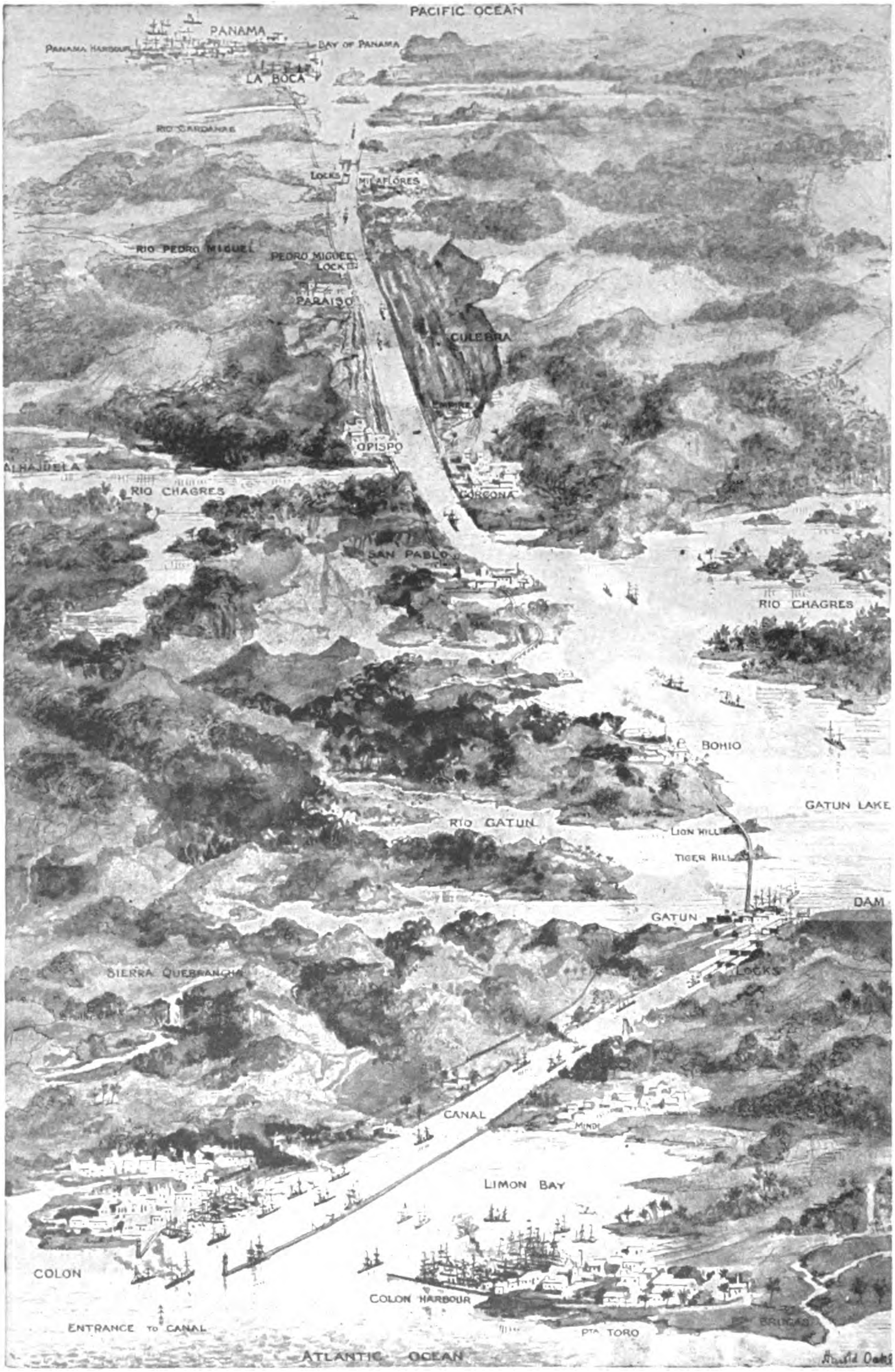
The great furnaces and boilers on a big ship would weigh more than a cathedral. The men walk through them as if they were in a street, with iron walls almost as high as houses. Behind these great iron walls the fire is boiling the water and making the steam which drives the wheels of the engines round and moves the ship along.

This is how the officers of the ship talk from the deck to the men down below in the engine-room.



The rooms on a ship are beautifully furnished, and some of them are big enough to hold a thousand people. This is the dining-room on one of the great ships which cross the Atlantic many times in a year.

CUTTING THE NEW WORLD IN TWO



This picture shows how the Panama Canal will look when finished. De Lesseps, the famous builder of the Suez Canal, began the work in 1881, but it had to be abandoned after nearly $350,000,000 had been wasted. The United States took over the work in 1903. There is now a vast army of men engaged in the stupendous task of cutting the New World in half, and it is estimated that this marvellous canal will cost $200,000,000 to finish.

The Child's Story of THE EARTH

WHAT THIS STORY TELLS US

We have learned already that the earth is round like a ball; we learn now that the great earth-ball is always spinning. If you could throw a ball into the air which would spin round and round like a top, and travel through space without ever stopping, the ball would be doing what the earth is always doing. Nothing seems so still as the earth on which we stand, but that is because it moves so smoothly. The earth is really moving faster than the fastest train; but we cannot tell that it is moving because it moves so quietly and smoothly, and everything moves with it. It is this movement that makes day and night. The sun does not rise nor set; it is the earth passing in and out of the sunlight that makes day light and night dark.

THE EARTH IS ALWAYS MOVING

CONTINUED FROM PAGE 7

THE first thing that we are inclined to say when we are told the earth moves is that we do not feel the earth moving, but the answer to that is easy.

When you are in a train in a station, you sometimes cannot tell whether the train is moving or not, except, perhaps, by looking at another train standing at the other platform, and sometimes you think your train is moving, until you see that the platform is quite still. It was the moving of the other train that made you think *your* train was moving. So it proves nothing to say that we do not feel the earth moving with us. If you are travelling in a train, or on a boat, or in a balloon, or on this great earth of ours, you have only two ways of judging whether you are moving or not. One is by feeling the movement under you, and the other by noticing that things outside seem to be moving past you.

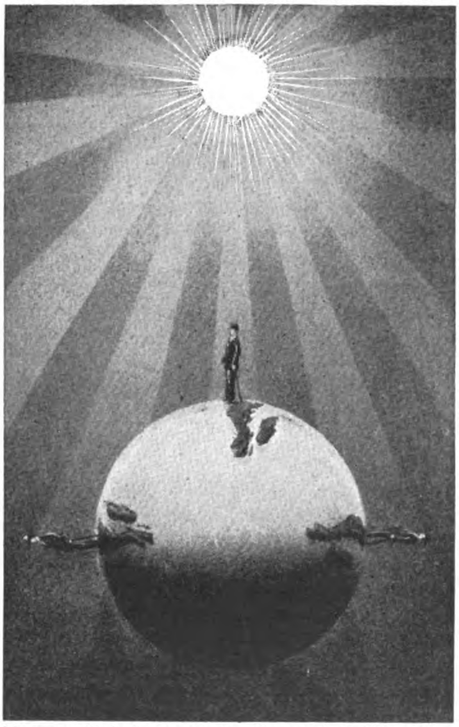
Now, certainly we cannot feel the earth move under us, but this is simply because the movement is so smooth. When you are inside a very big boat, you cannot tell whether the boat is moving if the sea is smooth. If you shut your eyes in a balloon on a calm day you cannot tell that it is moving—often you cannot tell even if your eyes are open. When we feel that a car is moving under us, that is only because its movement is jerky. Every time the car moves a little more slowly, our bodies go on moving forward at the old rate, and then are slowed up with a jerk; then, when the car goes on a little faster, our bodies are left behind a little, and then are jerked forward. So we know that the car is taking us where we want to go.

The more smoothly the car travels, the less can we feel its travelling. Now, of all the things that men can travel in, the balloon is said to be the smoothest, because when the air is quiet you cannot feel its motion at all. It is better than travelling in the best steamer, the newest electric train, or the finest motor-car. But really the smoothest thing to travel on is *the earth itself*, which we are all really travelling on all the time, no matter whether we are swimming or walking, or flying in a balloon. The best proof of the smoothness of the earth's motion is that no one has ever felt the earth moving. Sometimes a little bit of the outside of the earth moves by itself, and then people feel it. That is called an earthquake, and is quite different. No one has ever felt the movement of the earth as a whole.

What would happen if the earth suddenly stopped moving? If suddenly the earth *did* stop moving, as a car pulls up sharp, or as you pull your arm up sharp when you throw a ball, what would happen to us? When a car stops suddenly, all the passengers are jerked forwards. When you pull up your arm sharply to throw a ball, it is thrown forward ever so far. The earth is going so fast that, if it were suddenly to stop moving, all the loose things and many of the fixed things on it would be thrown off into space. They would not travel very far, perhaps, because they soon would be stopped by the air, just as the air helps to stop a ball when you throw it. But we may be quite sure that, if the earth suddenly stopped moving, all men and women and children and animals would be killed, all the water would be splashed out of the sea, all the fishes would die, and every city and building would be destroyed. That is not likely to happen.

If you cannot *feel* that the thing you are travelling on is moving, there is only one way of finding out that it is moving, and that is by looking at things outside, and seeing what they seem to do. Now, clever men have been doing this for ages and ages, and there seemed to be no doubt at all about what they saw. As we have already seen, when we look up at the sky we find the sun, for instance, seeming to travel once right round the earth every day. But just as a little boy in a railway train can make a mistake and can sometimes think that the other train is moving, when it is really *his* train that is moving, so all the men who thought they saw the sun moving across the sky were wrong. It was not the sun that was moving, but the earth. We still talk of the sun rising and setting, and no doubt men will go on doing so for ages, but the sun does not rise and set. It is simply the earth that is twisting round like a top. If you have not got a globe, a little round model of the round earth, you certainly should ask your father or mother to get you one. It is very nice to have a big one, as large as a giant snowball, but it is quite easy to get cheap little ones, no bigger than an orange, and it is wonderful how much you can learn from one of these with very little trouble. Now, if you have such a globe, you can easily learn from it something about the first kind of movement of the earth.

THE MEANING OF DAY AND NIGHT



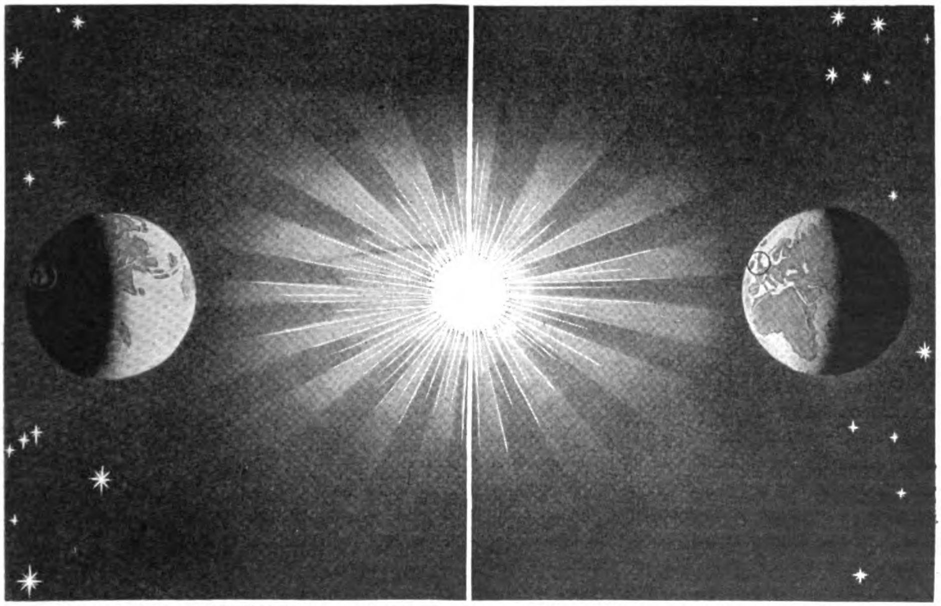
If we could look down upon the earth as if we were looking down on a spinning top, this is what a man would look like if he were big enough for us to see him. Suppose he stands in England at the time we call sunrise. To the right of the picture we see him entering the sunlight. As the earth spins round it **carries him nearer the sun, until at midday the sun is over his head. At night we see him passing out of the sunlight, at the time we call sunset, and he is in darkness until morning brings him round into the light again. This is the meaning of day and night.**

There are, at least, three different ways in which the earth is moving, and we must look at them all. The one we shall begin with explains why the sun seems to rise every morning in the east, and to set every evening in the west. Take your little globe—or, if you have not a globe, an india-rubber ball or an orange will do—and hold it in your hand opposite a lighted candle in a room where everything else is dark. The side of the ball next to the candle will be lit up, and the side away from the candle will be dark. Put a spot of ink on the ball, and call it your house, and hold the ball so that the spot of ink is opposite the candle. Now turn the ball slowly round, and as you do so the spot of ink will travel round until at last it loses the light of the candle. Then, as you go on turning, the spot of ink will at last become lit up again.

The candle stands for the sun, and when the spot of ink is just opposite the candle, that is *midday*. Then, as the ball—or the earth—goes on turning, the spot of ink—or your house—loses the candle-light; that is to say, the sun sets, and it is night. Then the spot turns to the side where the ball is lit up, and if you were on that spot you would say the sun had risen.

Just think what it would be like if it were always day, or if it were always night. If the earth were not for ever spinning round and round like a top, and if it were quite still, one half of it would always be in daylight, whilst the other would have an endless night. So long as you hold your ball, or globe, or orange, still, one half of it must be next the candle, and the other half must be away from it. What do you think would happen if the earth stopped moving round and round, and if it slowed down quietly like a top so as not to jerk us all off? Suppose it stopped with our part facing the sun, we should say: "The sun is standing still in the heavens." The lamplighters would do their work at the ordinary time. People would say: "It is a very bright evening," and then they would say: "Whatever has happened?"

There would be no night at all. It would just go on being day-time. Do you think that all the people from the other side of the world, where it was night all the time, would jump into their ships and come over to our side so as to see the sun again? I am sure they would, but I am also very sure that before long we should all be very glad to get on to the dark side of the earth, for a time, at any rate. If we did not, I think we should all go mad. The best thing for us is that the earth should go on spinning as it spins now, and that we should have the day to be awake in and the night for sleep.


THE EARTH ON A WINTER'S NIGHT IN ENGLAND THE EARTH ON A SUMMER'S DAY IN ENGLAND

This shows us why it is light by day and dark at night; it shows us also how the earth goes round the sun. In the right-hand picture of the earth it is midday in England, and that country, which has a ring round it in the picture so that you can find it, is in the full light of the sun. The other half of the world is in darkness, and it is night there. The earth is always spinning, and as it spins round we pass out of the light, and our side of the earth is then dark. That is night. So the earth spins round, in the light and out of it. It also travels round the sun. It takes the earth half a year to travel half round the sun as seen here, and on its journey right round the sun it spins round 365 times, making 365 days and 365 nights, which we call a year.

I have just read a story of some bees that worked hard all day, and then, just after they had all gone to rest, someone lit a brilliant electric light, like those we see in the streets, and brought a sham day back to them. They started work again until the electric light was put out, and then, soon after, the sun rose, and they started again. At the end of that day they were all worn out, and died from overwork. But the natural and proper thing for bees, and for men, too, who live on a great spinning top, is to be awake when the part of the top they are on is facing the sun, and to be asleep when it is turned the other way.

But the spinning of the earth, which gives us night and day, is by no means the earth's only movement. You will have noticed, when spinning a top, that sometimes it stands in one place and spins there, but sometimes, as it spins, it moves along the table. When this happens the top is moving in two ways at once. It is at the same time spinning on itself, so to speak, and also being moved as a whole from one place to another. The earth is like the top. All the time that the earth is spinning upon itself it is also moving as a whole, just as the top does when it moves along the table. We do not feel this, but it is the most important movement of the earth, even though its results are not so startling as the day and night which the spinning movement gives us.

THE GREAT FACT IN NATURE THAT MAKES A YEAR A REAL THING

There is no need now to ask what holds the earth " up." We know that the earth is not supported by anything, but flies through space without stopping from one year's end to another.

Now, I have purposely said " from one year's end to another," because this movement of the earth explains one year's end and another. A year, you know, is a real thing—not like a week. You think a week is a real thing because Sunday always comes back every seven days, and so do the other days. But we might just as well miss out Wednesday, Thursday, Friday, and Saturday, and make the week three days only. Long ago men agreed to call seven days a week, and we do so still. But a week is an *artificial* thing; a day is a *natural* thing, and so is a *year*. We say a week is an artificial thing because nothing in Nature makes it; but a day is a natural thing because a great fact in Nature makes it, that fact being the spinning of the earth. A year is also a natural thing because it is made by this second kind of movement of the earth, like the movement of the top *along* the table.

Let us think of a spinning ball now, instead of a spinning top. You know very well that a ball can spin as it goes along, because you can set it spinning on a table, and as it spins it will also run in one direction or another. What direction does the earth move in, then ? We have already seen that day and night, which never fail us, are due to its spinning. Now, on the whole, one night is just about as dark as another, and one day as bright as another—that is, if we think of all the days and nights we can remember.

THE EARTH IS ALWAYS FLYING ROUND THE SUN

This means that the earth does not get much nearer to the sun or go much further from it. It stays at just about the same distance, and yet it always goes moving onwards, onwards, onwards. That means that it *must* go *round the sun.* If you tied a string from your ball to your candlestick you could make the ball fly round the candle, only it would not be so easy to make the ball spin as it flew. If you could make it spin, and if you could make it spin on itself just about 365 times whilst it was going right round the candle once, that would be like what the earth is doing. The earth is always flying round the sun, and if you made a mark, so to speak, at some point, and then waited until the earth came back to that point after going round the sun once, the time the earth took in its journey would be a year, and during that journey round the sun the earth would have spun round on itself 365 times. Really, it is about 365 and a quarter times, and it is that we may not forget that quarter that every four years we have what we call leap year, making the year 366 days long by giving February 29 days instead of 28.

A GREAT MISTAKE THAT MILLIONS OF MEN HAVE BELIEVED

Now, this is very far from being all that there is to say about the year, and we shall come back to it. But at present, you remember, we are just trying to see the great facts which men had to discover before they could get any further with the story of the earth. These facts are that the earth is not flat, but a ball. It is not at rest, but never ceases moving. It spins round on itself, making day and night, and in doing so it has led millions of men to think that the sun goes round the earth every day. Also, this spinning earth travels right round the sun once a year.

The next story of the earth is on page 143.

THE TALES OF LONG AGO

WE turn to this part of our book for our stories, the great stories that we all love to hear. And what wonderful tales they are—tales of fairies, and giants, and ogres, and goblins, and castles, and mysteries which no wise man could ever understand. We shall read them here together. We shall meet here friends and enemies. Brave Jack the Giant Killer, beautiful Little Red Riding Hood, sad little Cinderella—all these and a whole host of wonderful people come into this part of our book. Who wrote these tales we do not know; but we know that since the world began boys and girls in every country have sat by the fire listening to the tales which never make us tired, and we know, too, that children will sit listening to them patiently as long as the world lasts.

Aladdin and the Wonderful Lamp

ONCE upon a time an African magician came to China to find a wonderful lamp.

In order to get it he had to crawl through a passage leading to a fairy palace beneath the earth. The passage was very small, and anyone who let his dress touch the walls was killed by magic. The magician did not like to risk his own life, so he made friends with a little Chinese boy, called Aladdin, and took him to the fairy palace.

"In this place," said the magician, "a treasure is hidden. Do what I tell you and you will become the richest man on earth. Keep this ring on your finger, and do not let your clothes touch anything until you have put out the little lamp that burns in the garden, and placed it in your pocket. Then you can take away as much treasure as you wish."

Down jumped Aladdin into the passage leading to the palace. He found the lamp in a garden where diamonds and pearls and rubies grew upon the trees. Putting it under his vest, he filled his pockets with jewels and returned to the passage.

"Give me the lamp, and then I will help you out," said the magician.

"No," said Aladdin; "help me out and then I will give you the lamp."

This made the magician very angry, and he closed up the opening in the earth, and went back to Africa.

For two days Aladdin wandered about the fairy palace without finding anything to eat, or any way of escape. On the third day he happened to rub the ring which the magician had put on his finger. A spirit then appeared before him, and said:

"I am the slave of the ring. What do you wish me to do?"

"Please take me home," said Aladdin.

In the twinkling of an eye he found himself outside his mother's house. She was a poor widow, and had nothing for him to eat and no money to buy him anything. So he gave her the wonderful lamp, and asked her to sell it and get some bread.

"It is very dirty," she said, giving it a rub.

A spirit then appeared, and said:

"I am the slave of the lamp. What do you wish me to do?"

The widow was too frightened to reply, but Aladdin boldly said:

"Please bring us something nice to eat."

In the twinkling of an eye a table appeared on which there were all kinds of meat and wine, in dishes of gold and goblets of crystal.

Having dined in this manner, Aladdin went out for a walk, just as the daughter of the King was riding by. Princess Badroulboudour, as she was called, was a lovely girl, and Aladdin fell in love with her. He went indoors and rubbed the wonderful lamp, and said to the spirit:

"Please make me rich and build me the finest mansion in the world."

In the twinkling of an eye Aladdin and his mother found themselves in a palace of gold, with six hundred servants to wait upon them, and wealth enough to buy a kingdom. They sent forty basins of gold filled with diamonds and pearls and rubies to the King, and he was so pleased with the gift that he allowed Aladdin to marry Princess Badroulboudour. Aladdin and his wife lived together in peace in the palace of gold until the African magician came again to try and get the wonderful lamp. He found that Aladdin was away hunting, and, disguising himself as a hawker, he walked around the palace shouting:

"New lamps for old! Who will change new lamps for old?"

"I will," said the Princess, running out into the courtyard.

The Princess remembered that there was a little dirty lamp in Aladdin's room, and she brought it out, and, in exchange for a large, bright, new one, gave it to the magician. It was the wonderful lamp! So the magician at once rubbed it, and commanded the spirit to carry the palace of gold and everything in it to the farthest part of Africa.

"Am I dreaming?" said Aladdin, when he came back from hunting. Where his palace had stood there was only a patch of bare ground. Happily, he still wore the ring which the magician had placed on his finger, and he now happened to rub it again.

"What do you wish me to do?" said the slave of the ring.

"Please bring back my wife and my palace," said Aladdin.

"Only the slave of the lamp can do that," replied the spirit.

"Well, take me to Princess Badroulboudour," said Aladdin.

And in the twinkling of an eye he found himself sitting beside his wife at a dinner-table in his palace in the farthest part of Africa. They were overjoyed to see one another, but before they were able to escape the magician came upstairs to dine with the Princess. Aladdin quickly crept under the table, and placed a powder in his wife's hand, which she put in her glass of wine.

"Here is an excellent wine," she said to the magician; "just taste it."

The bad magician drank the wine eagerly, and down he dropped, dead.

Aladdin rushed out, found the lamp in the magician's pocket, and rubbed it.

"Oh, please," he said to the spirit, "take the palace back to the place from which it was removed!"

Immediately the palace was taken up from the spot on which it stood in Africa, and set down in China, opposite the palace of the King, who gave them all his riches and made them his heirs.

The magician sat at dinner with the Princess, and the Princess put a powder into her wine. "Here is an excellent wine," she said to the magician; "just taste it." The bad magician drank eagerly, and dropped down dead.

THE STORY OF THE DAYS

SUNDAY; MONDAY; TUESDAY; WEDNESDAY; THURSDAY; FRIDAY; SATURDAY

Have you ever met Mr. and Mrs. Day? A more useful family you will never meet from one year's end to the other. They are, in fact, the best servants of the human race, and do as much work in their time as anything or anybody on the face of the earth. We must make their acquaintance.

The seven-roomed house in which they live is called "The Week," and it stands in Month Street, which is one of the twelve roads running through Year Town in the wonderful country of Time. We will enter this house and go through the seven rooms together. Mr. Day lives in one room, Mrs. Day in another, and their five children have each a room to themselves. But they are only separated from each other by walls of Sleep, and they talk to each other through the telephone of Dreams.

Now, this is the first room, occupied by Mr. Day, who does less work than the rest of the family, but who is very far from being idle. He puts on a surplice and holds Church services, and he also has to provide the whole of the human race with amusements and recreations. He is the father of the family, and he is known by the name of Sun Day.

"Hullo, Mr. Sun Day! How are you? Glad to see you. But everybody's that, eh? There is no member of your family quite so popular as you are! Come, I hope you are glad to see me, too. I've brought a little friend with me, who wants to know how you got your name, and to hear something of your history. Do you feel like talking for a few moments?"

"How I got my name? Well, that's an old story, that is. How I got my bad name isn't nearly so old; and how I am getting my good name is quite a new story. Nevertheless, just to oblige your young friend, I'll run the whole three stories into one, and begin with the old one. Far back in the history of the world, young friend, people could see nothing so wonderful, nothing so beautiful, and nothing so useful as the sun. They had in them what is called the *instinct of worship*—that is to say, they had a feeling that there was Something greater, stronger, and more glorious than themselves — Something that they

AGES AGO MEN WORSHIPPED THE SUN AND CALLED THE FIRST DAY OF THE WEEK AFTER HIM ought to fear, reverence, and worship. The sun seemed to these first people the token or sign of that Something, and they worshipped it. The sun, in fact, became the visible expression of God. Now, when the world got wiser, and men and women knew more about the true God, they still kept the old idea of the heathen in their heads, and called the Christian Sabbath —which means the day of rest—Sunday. They no longer worshipped the sun, but they called the first day of the week after him, and that is how I got my name.

" People loved me then, and I gave rest, and pleasure, and festivity to hundreds of generations. Well, as time passed on. people began to make me anything but a sun-day ; they made me a black day. Children were not allowed to play ; books and games were put away and locked up in cupboards as something wicked ; and all my precious hours were spent in gloom and solemnity.

" Then it was that I got a thoroughly bad name. People said Sunday was the gloomiest day in the week ; they ate too much, and set about yawning and grumbling. Just lately I've reminded them that the Founder of Religion once said: The Sabbath was made for man, not man for the Sabbath. They don't quite understand just yet what that means. Some of them are noisy and wild and foolish on the Sabbath ; they have gone to the other extreme. But it will come right soon. People will use me for rest of body and mind in a proper way, and my good name will be restored.

" Well, let us pass to the next room and see what Mrs. Day will tell us."

" I've no time to stay to gossip. I'm a busy woman. Everybody knows that I'm the busiest Day in the week. It's coming after Sunday that does it. Ah, he's a lazy fellow, my husband is ! The mess I have to clear up after him ! I don't believe in holidays—except Easter Mondays. Let everyone do his work."

MONDAY WAS SACRED TO THE MOON, THE WIFE OF THE SUN, WHO WALKED IN THE WOODS

" We mustn't interrupt her," said Mr. Day. " Her name of Mon is short for Moon. She is really Moon Day, the day sacred to the wife of the Sun. In ancient times people called the goddess of the moon Diana, and temples were built for her in nearly every quarter of the world. They used to think that Phœbus Apollo, the Sun God, drove his flaming chariot across the sky by day, and that Diana drove her silver chariot through the sky by night. They loved Diana because she was gentle and beautiful. Woods were sacred to her because she could be seen walking through them. Round cakes were

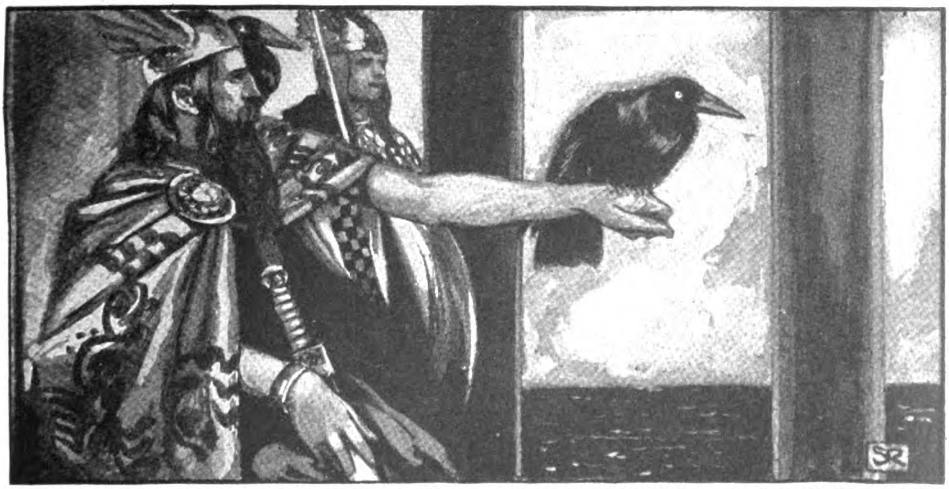
TYR, THE GOD OF WAR, CAPTURED THE WOLF-SPIRIT, AND TUESDAY IS NAMED AFTER HIM

made on her feast day, with candles stuck round them. Boys and girls considered Diana their own particular goddess, and loved her very much."

And now we must peep into the room of Mr. and Mrs. Day's eldest son, Master Tues Day. You observe that he has only got one hand, and the story of how he lost his other hand is the story of how he came by his name.

The Norsemen had a god of war named Tyr, and when a terrible wolf-spirit, named Fenris, had to be captured, because he was troubling the whole earth, it was Tyr who undertook the dangerous venture. The spirits of the mountains had made a chain out of the hardest things in the world to find—the footsteps of a cat, the beards of women, the roots of stones, the breath of fishes, the nerves of bears, and the spittle of birds. This strange chain could not be broken, and with it Fenris was to be bound.

But Fenris would not allow even this soft-looking chain to be put round his neck, and said he would only suffer it if the gods would promise to take it off again, and would send a god to put his hand in the wolf's mouth. Tyr was the only god brave enough to volunteer. He put his hand in the mouth of Fenris, and Fenris was bound; then, in his rage at being captured, he bit off the hand of the god. It is curious that the French name for Tuesday is Mardi—that is, the day of Mars, who was also a god of war like the Norseman's Tyr, who gives us Tyr's Day, or Tuesday.



WEDNESDAY IS CALLED AFTER WODEN, WHO SENT RAVENS ROUND THE WORLD FOR NEWS

THE MORE THAT THOR, THE GOD OF THURSDAY, TRIED TO DRAIN THE HORN, THE MORE IT FILLED

The second son of Mr. and Mrs. Day is named after Woden, or Odin, the greatest god of the Scandinavians. Woden lived in a palace built entirely of gold and silver, which was called Valhalla. Two ravens stood on his shoulders, and when he wanted news of the world he sent these ravens to fly round the earth and bring him intelligence of everything they saw and heard.

Round about him stood maidens with helmets, and spears, and shields, and these maidens, named Valkyries, were sent down to earth to bring the souls of heroes slain in battle to feast with Woden in Valhalla. While they feasted, Woden listened to their stories and drank mead. He never ate anything himself. Our friend Wednes Day is rather odd and capricious in his habits. He sends his Valkyries to bring boys and girls into Valhalla for a half-holiday, but leaves the rest of the world hard at work. But he is a good fellow, and everybody likes him. He lives in the middle of the house, and seems to be saying all day long :

" Work away ; work away ! Sunday will soon be here again."

And now here we are at the fifth room, occupied by Master Thurs Day. Isn't he a big, strong, vigorous fellow ? If ever you have a hard bit of work to do, start at it on Thursday—the day of strength and power. Thurs Day gets his name from Thor, the strongest of all the Scandinavian gods. Thor had a

FRIDAY WAS NAMED AFTER FREYA, THE WIFE OF WODEN, SO THAT SHE MIGHT NOT BE JEALOUS hammer which no man could lift, a pair of iron gloves, and a belt which, when it was fastened round him, doubled his great strength. But once the mighty hammer was lost, and a giant named Thrym hid it. He said he would only give it up if the goddess Freya would marry him. Thor disguised himself in Freya's dress and went to visit the giant. Imagine the giant's surprise when he saw the lovely goddess eat a whole ox and eight salmon at a single sitting! The companion of Thor explained that the long journey had made the goddess hungry. Thor received the hammer, and slew Thrym and all the other giants. But there were some things beyond even his power. He tried to lift a cat, and couldn't; it was the serpent Midgard, who holds the earth in its embrace. He tried to drain a horn dry, but the more he drank the more it filled; the other end of the horn was fastened to the sea, and could not be drained.

The sixth room belongs to Mr. and Mrs. Day's only daughter, Fri Day, named after the goddess Freya, who refused to marry Thrym. How this female Day got her name is rather sad. Woden was Freya's husband, Thor her son; and it was only because she might be jealous that our ancestors named a day after her when they had given one to Woden and one to Thor. However, Friday is a very sacred day, although some superstitious people think it is a day of ill-luck.

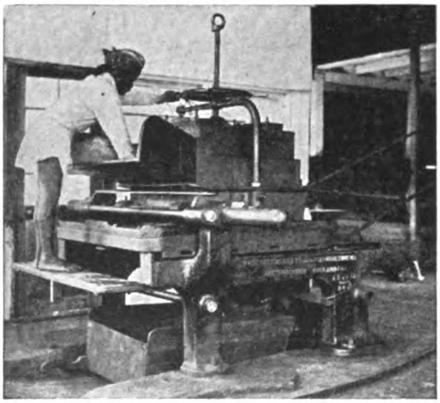
And now here is another half-holiday room, Satur Day, who gets his name from the Roman god Saturn. Saturn was a god who ate his own children and behaved in a very barbarous fashion. We won't speak much about him. For us Saturday is one of the pleasantest days in the week, although some of the games and feastings of our Saturday crowds remind us of those terrible Saturnalia which disgraced Rome. It is a very good thing for us that the Day family, in spite of their heathen names, are now, practically speaking, Christians. The more Christian they become, the better we shall like them.

SATURDAY IS THE DAY OF SATURN, IN WHOSE HONOUR THE ROMANS USED TO FEAST AND DRINK

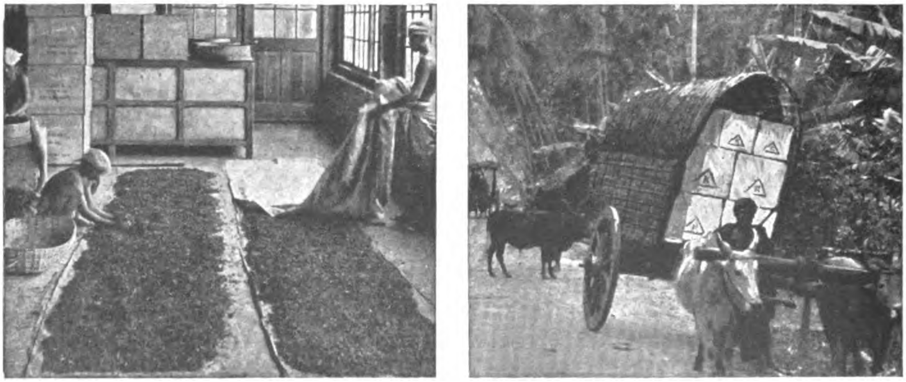
HOW THE TEA COMES TO THE TABLE

Tea has a long journey of many thousands of miles before it reaches the teapot. Some of it grows in China, in small fields and on the hillsides, but most of it grows in the large tea-gardens of India. The tea grows in small bushes, and the leaves are picked and put into baskets. Great numbers of men, women, and children spend all the working part of their lives picking the tea-leaves from the plant. The leaves must be carefully picked off with the thumb-nail, without being torn, and a good picker picks 20 or 30 pounds in a day.

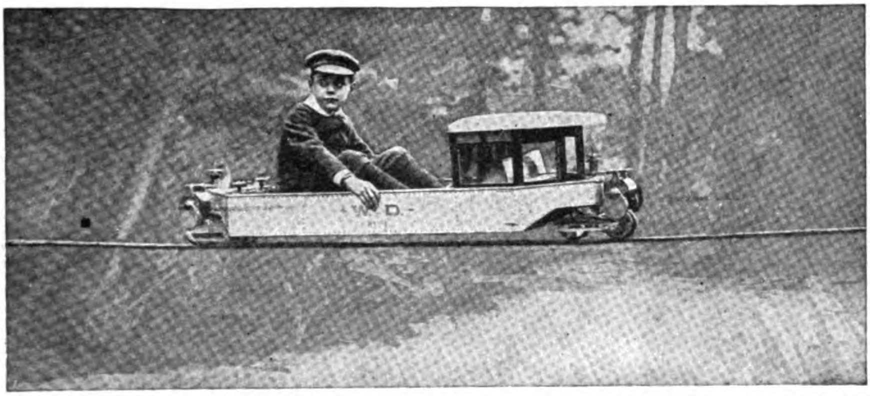
After being sorted, the green leaves are spread out on long wooden trays in a house where they can get plenty of air to make them tough without becoming hard and dry. They are then like kid.



After lying in a good draught, the leaves are taken off the trays and rolled between heavy rollers. Some are then put on one side to become black and strong, and the rest of the tea is packed while it is green.

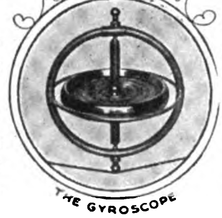


The tea is next wrapped up in lead packets or packed in wooden chests, and the packets and chests are taken to the ship by oxen. The good ship brings the tea thousands of miles by sea, and at last it comes home and we find it on our table; and when we see the tea-leaf floating in the cup we shall have a new interest in it now that we know the story of its long journey. To make one pound of tea ready for use takes a man's work for a day, and a man must work for a week to prepare tea to last one of us for a year.



CAN A TRAIN RUN ON ONE RAIL?

CONTINUED FROM 43



THE GYROSCOPE

It is, of course, impossible for an ordinary train to run on one rail, because the wheels are placed in pairs, some being on each side of the carriage, therefore they must have a pair of rails to run upon. But it would be a different matter if the wheels were placed in front of each other underneath the middle of the carriages, so that there were but a single row.

The wheels of such a train would, of course, run upon a single rail, and the train would have to be, somehow or other, balanced on this one rail, so as not to fall. Of course, we can understand that it might be balanced while moving, just as a bicycle is, but that would not do for a train, which must remain balanced when moving slowly and when standing still.

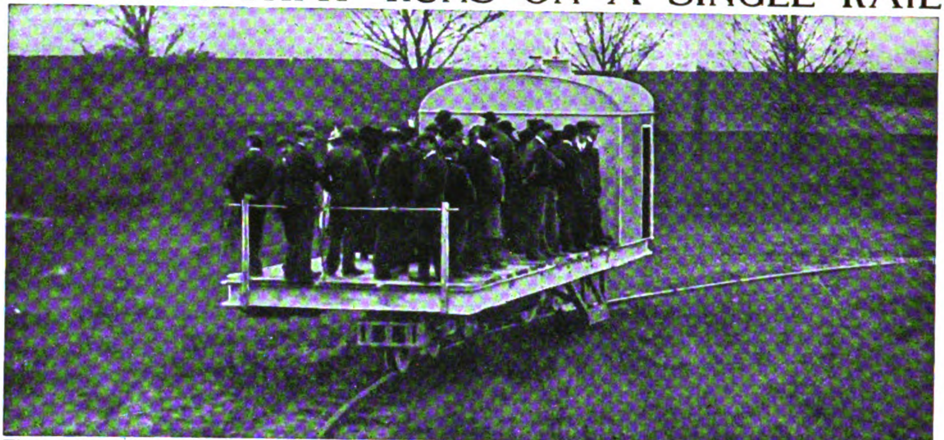
It is quite possibie to make a train to run on a single central rail, and it can be balanced by having the rail pushed up, so to speak, right into its centre. Then the train hangs down on each side of the rail, as we see in the top picture on page 91. It is a very great advantage to the speed of the train to be built in this way, for the number of wheels is halved, and that means halving the friction, which largely helps to retard the train. Thus very great speeds can be attained, such as one hundred and twenty or a hundred and thirty miles an hour. There are other ways, also, in which moving things may be balanced on a single rail, and we shall be quite accustomed to such things in the not very distant future, for an Irishman, Mr. Louis Brennan, has shown us how to use the gyroscope, that top which we all know so well, for this purpose.

THE PRINCIPLE OF THE GYROSCOPE

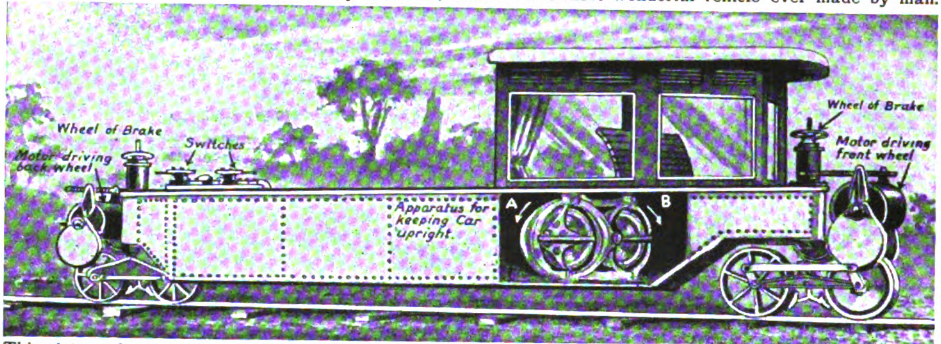
The principle of the gyroscope can be understood by watching *any* top balance itself on its point when revolving at high speed ; but a gyroscope top has been invented which shows it still more clearly. This consists of a metal disc supported on a pivot within a cage in such a way that if the disc is set spinning, the cage can be placed on any kind of surface, even a wire, pencil, or pin point, and will remain perfectly balanced as long as the disc inside revolves at high speed.

From this you can see how two big gyroscopes, having heavy fly wheels of several tons' weight, and revolving several thousand times a minute in opposite directions, within cages which are properly fastened to a car, would easily balance this car on a single rail.

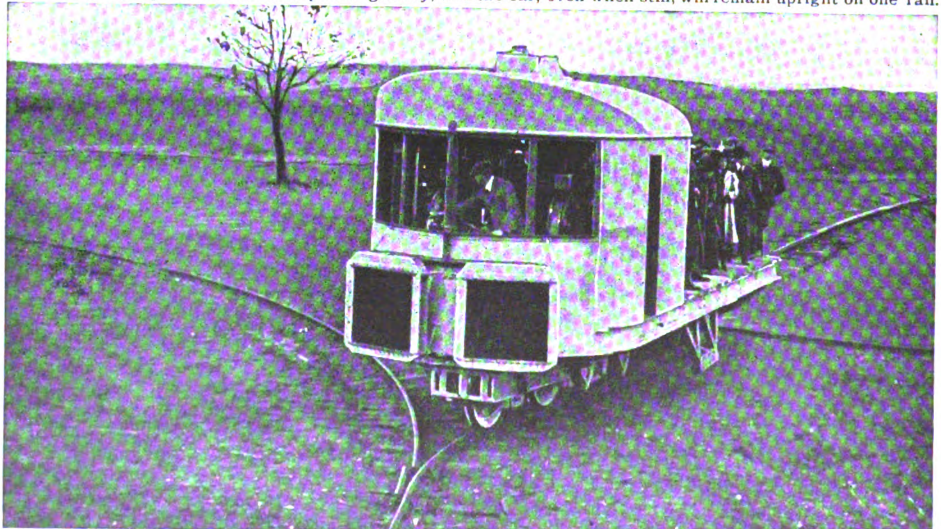
A TRAIN THAT RUNS ON A SINGLE RAIL



The wonders of travel never cease, and with all the advances that have been made in recent years, still greater marvels are in store for us. It is probable that before long we shall be able to travel at a speed of 150 or 200 miles an hour, in a train that will run on a mono-rail—that is, a single rail instead of a pair of lines. In this picture we see a mono-rail car, recently invented, which is the most wonderful vehicle ever made by man.

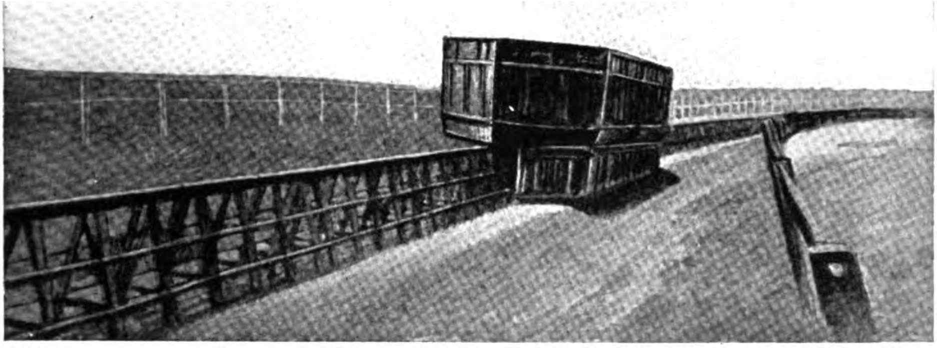


This picture shows us the principle of the mono-rail car in the picture above, which is called a gyro-car, because it is fitted with two gyroscopes, A and B, like those toy tops that spin in all positions. The centrifugal force of the whirling tops counteracts the pull of gravity, and the car, even when still, will remain upright on one rail.

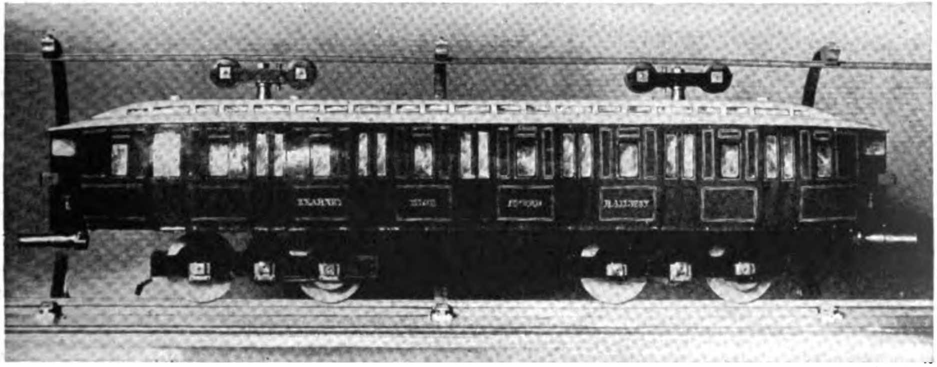


This marvellous railway car, invented by Mr. Louis Brennan, an Irishman, carries forty people, and will remain upright and steady on a single rail, whether it be travelling or standing still. The gyroscopes that keep it upright make 3,000 revolutions a minute, and will go on spinning for two days after the driving power is cut off.

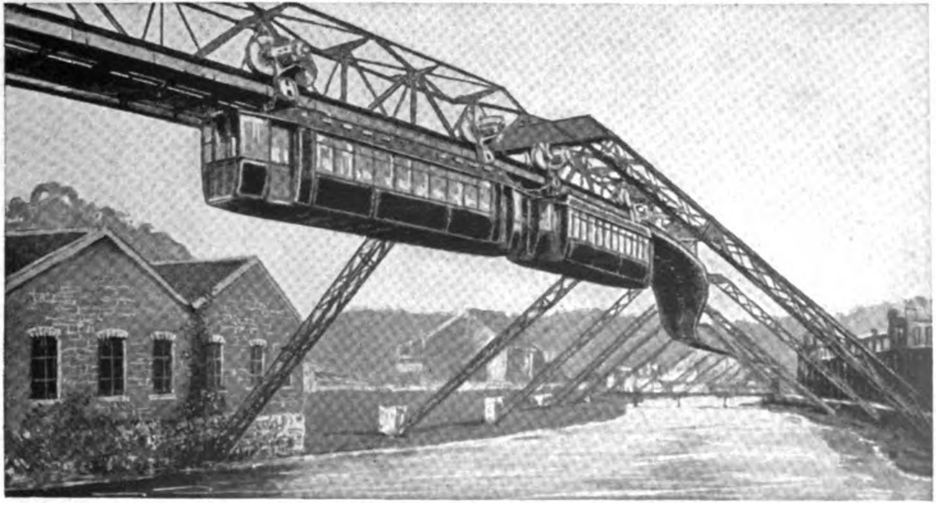
HOW SOME PEOPLE GO BY TRAIN



While the gyro-car, described on page 4902, is a new invention that has yet to be brought into practical use, there are several railways actually working in which only a single rail is used. One of these is at Ballybunnion, **in Ireland, where a speed of 83 miles an hour is reached. Another is being made between Manchester and Liverpool, and the journey of 34 miles is to be made in 20 minutes. This picture shows a mono-railway at Brussels.**



Another kind of mono-rail is known as the Kearney system, in which a guiding rail is suspended by iron supports above the train, and pairs of wheels, placed at intervals on the car, grip this rail, and thus steady the car. Although in one sense this is a mono-rail system, yet the upper rail almost constitutes a double line.



A very successful mono-rail track is the Wupper Valley Railway, which runs from Elberfeld to Barmen, in Prussia. The trains are suspended from a single rail supported on iron girders The railway is more than eight miles long, and for a considerable part of the course the railway hangs over the River Wupper. Each car carries fifty passengers, and with its load weighs about 14 tons. This railway has proved a great success.

Wynken Blynken and Nod

WYNKEN, Blynken, and Nod one night
Sailed off in a wooden shoe,
Sailed on a river of mystic light
Into a sea of dew.
"Where are you going, and what do you wish?"
The old moon asked the three.
"We have come to fish for the herring fish
That live in the beautiful sea;
Nets of silver and gold have we,"
Said Wynken,
Blynken, and Nod.

THE old moon laughed and sang a song
As they rocked in the wooden shoe;
And the wind that sped them all night long
Ruffled the waves of dew;
The little stars were the herring fish
That lived in that beautiful sea.
"Now cast your nets wherever you wish,
But never afeared are we!"
So cried the stars to the fishermen three,
Wynken,
Blynken, and Nod.

ALL night long their nets they threw
For the fish in the twinkling foam,
Then down from the sky came the wooden shoe,
Bringing the fishermen home:
'Twas all so pretty a sail, it seemed
As if it could not be;
And some folk thought 'twas a dream they'd dreamed
Of sailing that beautiful sea;
But I shall name you the fisherman three.
Wynken,
Blynken, and Nod.

WYNKEN and Blynken are two little eyes,
And Nod is a little head;
And the wooden shoe that sailed the skies
Is a wee one's trundle-bed.
So shut your eyes while Mother sings
Of wonderful sights that be,
And you shall see the beautiful things
As you rock in the misty sea
Where the old shoe rocked the fisherman three,
Wynken,
Blynken, and Nod.

EUGENE FIELD

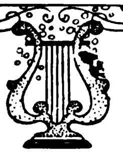
From "With Trumpet and Drum," copyright, 1892, by Mary French Field, published by Charles Scribner's Sons.

THE WORLD'S GREAT POEMS

It is a splendid thing to be able to say something which the world will never forget, and many books that will never die have been made up of fine words spoken and written by great men and great women. Most of these never-to-be-forgotten words are in poems, because poems are much more easy to remember than ordinary reading, which we call prose. There are thousands of beautiful poems that everybody ought to read, and nobody who does not read them can really know how fine a thing reading is. True poetry is more precious than gold. It helps to make us good, and happy, and hopeful, and it is so pleasant to read that the words sound like music. We shall find in this part of our book some of the best of all these poems, which will make us anxious to read more and more poetry as time goes on.

POETRY THE MUSIC OF WORDS

By J. A. HAMMERTON



There are two ways of writing a story, or telling about a place or a thing or an event. The one way is to write it down in words like those we use in speaking one to another, but using the words more carefully, so that they will give as good an idea of what we have seen or thought as words can give. This kind of writing is called Prose. The words and sentences used by great writers are so well chosen and arranged that they give us a clear idea of what has been in the writer's mind, and in reading them aloud we find that they have a fine and pleasing sound.

But there is another kind of writing in which the words and sentences used by the writers sound far sweeter and more musical than the words of prose. This we call Poetry, and those who write it are called Poets.

Prose is used to tell almost any kind of story, or to describe anything; but there are grand things in history, beautiful scenes in the world, noble thoughts in the minds of men, that can be better described in poetry.

Poetry began, very likely, with the desire for singing, which comes when we are very happy or after a success of any kind. Long ages ago, when our far-off forefathers could not even read or write, they had poets who went with them into battle, and after the victory these poets, or bards, as they were called, would compose verses of fine-sounding words to celebrate the victory. These verses they sang while they played a harp. In this way poetry began, perhaps, men having their minds full of happy thoughts, and finding that they could best utter these thoughts by choosing words of musical sound. Homer, one of the greatest of poets, was a blind Greek who lived more than eight hundred years before Christ. He used to recite in public places in Greece his poetical descriptions of the wars of the Greeks.

There are three kinds of poetry. There is Dramatic Poetry, which is written in the form of people speaking to each other, as in the plays of Shakespeare. Then there is Epic Poetry, which is usually a description of some great event, a hero, or the history of a nation, told in grand, noble words. The third kind is called Lyric Poetry, from the fact that it was originally intended to be sung to the playing of a lyre, which is a very ancient musical instrument somewhat like a harp. All beautiful songs come into lyric poetry.

Another thing to know is that poetry is written sometimes in rhymed lines and sometimes without rhymes. A rhyme means that similar sounds occur at the ends of lines, though the words are different. Here is one, with the sound that makes the rhyme printed in different type:

The world is so full of a number of th*ings*,
I'm sure we should all be as happy as k*ings*.

If you count the syllables in these two lines you will find that both have eleven. There should always be a certain number of syllables in a line of poetry, but the number will depend on the plan the poet has arranged. Your ear should always tell you when there are too many or too few.

HOW THE POETS MAKE THEIR RHYMES

The words in which the same sounds occur need not be in following lines, but can be placed in all sorts of different ways. The rhymes in the verse below are alternate, which means that each line ends with the same sound as the next line but one after it:

Arabia's desert-*ranger*
  To Him shall bow the KNEE,
The Ethiopian st*ranger*
  His glory come to SEE.

And here is another form of verse, in a tiny poem by Robert Louis Stevenson, in which half of the lines rhyme, while the other half have no rhymes:

The rain is raining all around,
  It falls on field and tr*ee*,
It rains on the umbrellas here,
  And on the ships at s*ea*.

The only advantage of rhyme is that it pleases the ear and helps us to remember all the words of the poem, but it does not make poetry, and much of our finest poetry has no rhymes in it.

When a poem has no rhymes it is called Blank Verse, and most of Shakespeare's works, and Milton's also, were written in this kind of verse; full of grand-sounding words and of lines that would have been far less noble and dignified if every two of them had ended with similar sounds.

POEMS THAT DO NOT NEED RHYMES

For this reason nearly all poems about great events, tragedies, the deeds of noble men and women, are written in blank verse, which is more suited to those stories than lyric verse. Here is an example of blank verse from Shakespeare's description of Brutus:

His life was gentle; and the elements
So mix'd in him, that Nature might stand up,
And say to all the world, This was a man!

How fine these lines sound! They have the solemn music of a grand organ and need no rhyme; but each line must balance with the other in syllables and accent. Lyric poetry, in which the lines usually rhyme with each other, is oftenest used to describe the lighter and happy side of life, and in the CHILD'S BOOK OF POETRY it will nearly always be the happy side of life we shall hear about from the poets.

English poetry has a very long history, and was first written by men when our language was so different from what it is to-day that it looks almost like a foreign tongue when we see it printed now. But we will not go so far back to seek for poems among the works of our old writers. The first really great poet who lived in England was Geoffrey Chaucer, and no boy or girl could read the poems which he wrote unless they were turned into modern English. Even then they are not very well suited to young readers, and for this reason we shall take very little, if anything, from Chaucer, who died more than five centuries ago. After his death, for many years there was not much good poetry written in England, and his is the one really great name that stands out among the poets of what we call the Middle Ages.

GREATEST OF ALL THE POETS IN THE WORLD, WILLIAM SHAKESPEARE

The English language in those far-off days was going through many changes; and it was just about the time when Queen Elizabeth came to the throne that it had become one of the finest languages in the world in which to write either prose or poetry.

Our language has not changed very greatly since the days of Elizabeth, so that William Shakespeare, the wonderful poet who was born during her reign and became the greatest poet of his age, and the greatest ever born in England, used very much the same language as Tennyson, who lived in our own day, nearly three hundred years later. For this reason Shakespeare is to be thought of as a writer of what we call Modern English, and in his poems we shall find that our language is used in the most beautiful way it can be used.

We might begin our readings in the wonderful book of English poetry with a number of poems and passages from Shakespeare; but perhaps young readers will prefer to have different poems from different poets in each part, and thus to become acquainted with many as soon as possible. So, like bees in a rich garden, we shall go from flower to flower gathering our honey as we choose.

*MY SHADOW

We often have fancies that come to our minds at odd times, but only the poet can lay hold of these fancies and keep them for the delight of all who may read. "My Shadow" is an example of this. We must all, in our young days, have had some such thoughts, but only Robert Louis Stevenson, who wrote this pretty poem, was clever enough to turn these thoughts into words that can live.

I have a little shadow that goes in and out with me,
And what can be the use of him is more than I can see.
He is very, very like me from the heels up to the head ;
And I see him jump before me when I jump into my bed.

The funniest thing about him is the way he likes to grow—
Not at all like proper children, which is always very slow ;
For he sometimes shoots up taller, like an indiarubber ball,
And he sometimes gets so little that there's none of him at all.

He hasn't got a notion of how children ought to play,
And can only make a fool of me in every sort of way.
He stays so close beside me, he's a coward, you can see ;
I'd think shame to stick to nursie as that shadow sticks to me.

One morning, very early, before the sun was up,
I rose and found the shining dew on every buttercup ;
But my lazy little shadow, like an arrant sleepy-head,
Had stayed at home behind me, and was fast asleep in bed.

*ARMIES IN THE FIRE

Looking into the fire at night when all is still and only the burning coals sputter and crackle, what strange pictures we seem to see! Did you ever see an army marching in the fire? That is what R.L. Stevenson once fancied he saw, and in this poem he paints his fancy over again in words. This poem, like "My Shadow," and other of Stevenson's verses which we shall print, is taken, by permission of Messrs. Longmans, Green & Co., from "A Child's Garden of Verses."

The lamps now glitter down the street ;
Faintly sound the falling feet ;
And the blue even slowly falls
About the garden trees and walls.

Now in the falling of the gloom
The red fire paints the empty room :
And warmly on the roof it looks,
And flickers on the backs of books.

Armies march by tower and spire
Of cities blazing in the fire—
Till, as I gaze with staring eyes,
The armies fade, the lustre dies.

Then once again the glow returns ;
Again the phantom city burns ;
And down the red-hot valley, lo!
The phantom armies marching go.

Blinking embers, tell me true,
Where are those armies marching to,
And what the burning city is
That crumbles in your furnaces.

THE BROOK

This is one of the most beautiful of all Lord Tennyson's poems. We fancy we can hear the brook speaking as we read these verses, and if you will sit beside a brook and read them you will come to feel something of the music and poetry of Nature, and the sound of the running brook will seem, in your ears, a song of joy. It is a poem of natural joy, and was written as part of a longer poem, but is complete in itself.

I come from haunts of coot and hern,
I make a sudden sally,
And sparkle out among the fern,
To bicker down a valley.

By thirty hills I hurry down,
Or slip between the ridges,
By twenty thorps, a little town,
And half a hundred bridges.

Till last by Philip's farm I flow
To join the brimming river,
For men may come and men may go,
But I go on for ever.

I chatter over stony ways,
In little sharps and trebles,
I bubble into eddying bays,
I babble on the pebbles.

With many a curve my banks I fret
By many a field and fallow,
And many a fairy foreland set
With willow-weed and mallow.

I chatter, chatter, as I flow
To join the brimming river,
For men may come and men may go,
But I go on for ever.

I wind about, and in and out,
With here a blossom sailing,
And here and there a lusty trout,
And here and there a grayling.

And here and there a foamy flake
Upon me, as I travel
With many a silvery waterbreak
Above the golden gravel.

And draw them all along, and flow
To join the brimming river,
For men may come and men may go,
But I go on for ever.

I steal by lawns and grassy plots,
I slide by hazel covers ;
I move the sweet forget-me-nots
That grow for happy lovers.

I slip, I slide, I gloom, I glance,
Among my skimming swallows ;
I make the netted sunbeam dance
Against my sandy shallows.

I murmur under moon and stars
In brambly wildernesses ;
I linger by my shingly bars ;
I loiter by my cresses ;

And out again I curve and flow
To join the brimming river,
For men may come and men may go,
But I go on for ever.

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* From "Poems and Ballads," copyright, 1895, 1896, by Charles Scribner's Sons.

THE ENCHANTED SHIRT

This poem by John Hay, an American author and statesman, tells of a discontented, ill-tempered king, whose wisest doctor said he could only get well by sleeping one night in the shirt of a happy man. His kingdom was searched for a happy man, but the only man who was happy was so poor that he had no shirt at all. Thus was the rich, discontented king made to feel shame, and to realise that a contented mind is far better than great possessions.

The King was sick. His cheek was red,
And his eye was clear and bright;
He ate and drank with a kingly zest,
And peacefully snored at night.

But he said he was sick, and a king should know,
And doctors came by the score;
They did not cure him. He cut off their heads,
And sent to the schools for more.

At last two famous doctors came,
And one was as poor as a rat;
He had passed his life in studious toil,
And never found time to grow fat.

The other had never looked in a book;
His patients gave him no trouble;
If they recovered they paid him well,
If they died their heirs paid double.

Together they looked at the royal tongue,
As the King on his couch reclined;
In succession they thumped his august chest,
But no trace of disease could find.

The old sage said, "You're as sound as a nut."
"Hang him up!" roared the King, in a gale—
In a ten-knot gale of royal rage.
The other leech grew a shade pale.

But he pensively rubbed his sagacious nose,
And thus his prescription ran—
The King will be well if he sleeps one night
In the shirt of a Happy Man.

Wide o'er the realm the couriers rode,
And fast their horses ran;
And many they saw, and to many they spoke,
But they found no Happy Man.

· · · · · · · · · · ·

At last they came to a village gate,
A beggar lay whistling there;
He whistled and sang and laughed and rolled
On the grass in the soft June air.

The weary couriers paused and looked
At the scamp so blithe and gay;
And one of them said, "Heaven save you, friend!
You seem to be happy to-day."

"O yes, fair sirs!" the rascal laughed,
And his voice rang free and glad;
"An idle man has so much to do
That he never has time to be sad."

"This is our man," the courier said;
"Our luck has led us aright;
I will give you a hundred ducats, friend,
For the loan of your shirt to-night."

The merry blackguard lay back on the grass,
And laughed till his face was black;
"I would do it, God wot," and he roared with the fun,
"But I haven't a shirt to my back."

Copyright, 1871, 1880, 1899, by John Hay.

Each day to the King the reports came in
Of his unsuccessful spies,
And the sad panorama of human woes
Passed daily under his eyes.

And he grew ashamed of his useless life,
And his maladies hatched in gloom;
He opened his windows and let the air
Of the free heaven into his room.

And out he went in the world and toiled
In his own appointed way;
And the people blessed him, the land was glad,
And the King was well and gay.

A FAREWELL

Charles Kingsley was a clergyman who wrote some stories that are among the best we have. He was also a writer of poetry, and this is one of the best known of his smaller poems. It was written for a girl as farewell advice. Like all good people, he loved children, and delighted to write for them. The poem reminds us that it is better to be good and to do good than to be clever and win fame and fortune. "A Farewell" is printed here by permission of Messrs. Macmillan, the publishers.

My fairest child, I have no song to give you;
No lark could pipe in skies so dull and gray.
Yet, if you will, one quiet hint I'll leave you,
For every day.

I'll teach you how to sing a clearer carol
Than lark who hails the dawn o'er breezy down,
To earn yourself a purer poet's laurel
Than Shakespeare's crown.

Be good, sweet maid, and let who can be clever;
Do noble things, not dream them, all day long,
And so make Life, Death, and that vast Forever,
One grand, sweet song.

THE DAFFODILS

William Wordsworth was one of the greatest English poets, and this poem is one of the many pieces in which he writes clearly and lovingly of Nature and the beauties of flower-land. It was written just a hundred years ago, after the poet had seen a wonderful blow of golden daffodils on the shores of Lake Ullswater, not far from where he lived. The last four lines mean that the recollection of beautiful things seen with our own eyes is one of life's greatest joys.

I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host of golden daffodils:
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.

Continuous as the stars that shine
And twinkle on the milky way,
They stretched in never-ending line
Along the margin of a bay:
Ten thousand saw I at a glance,
Tossing their heads in sprightly dance.

The waves beside them danced, but they
Outdid the sparkling waves in glee:
A poet could not but be gay,
In such a jocund company;
I gazed—and gazed—but little thought
What wealth the show to me had brought.

For oft, when on my couch I lie
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure fills,
And dances with the daffodils.

THE WRECK OF THE HESPERUS

A BALLAD means a story in verse, and should always be told in a plain, straightforward way. This beautiful poem by H. W. Longfellow is one of the finest ballads we could choose. The tragic story of the wreck of the vessel, the picture of the raging storm, the finding of the drowned child—all is told without waste of words, but in just the very words that mean most and stir the imagination of the reader.

It was the schooner Hesperus,
That sailed the wintry sea ;
And the skipper had taken his little daughter,
To bear him company.

Blue were her eyes as the fairy-flax,
Her cheeks like the dawn of day,
And her bosom white as the hawthorn buds,
That ope in the month of May.

The skipper he stood beside the helm,
His pipe was in his mouth ;
And he watched how the veering flaw did blow
The smoke now west, now south.

Then up and spake an old sailor,
Had sailed the Spanish Main :
" I pray thee, put into yonder port,
For I fear a hurricane.

" Last night the moon had a golden ring,
And to-night no moon we see ! "
The skipper, he blew a whiff from his pipe,
And a scornful laugh laughed he.

Colder and louder blew the wind,
A gale from the north-east ;
The snow fell hissing in the brine,
And the billows frothed like yeast.

Down came the storm, and smote amain
The vessel in its strength ;
She shuddered and paused, like a frighted steed,
Then leaped her cable's length.

" Come hither ! come hither ! my little daughter,
And do not tremble so ;
For I can weather the roughest gale,
That ever wind did blow."

He wrapped her warm in his seaman's coat
Against the stinging blast ;
He cut a rope from a broken spar,
And bound her to the mast.

" O father ! I hear the church-bells ring,
O say, what may it be ? "
" 'Tis a fog-bell on a rock-bound coast ! "—
And he steered for the open sea.

" O father ! I hear the sound of guns,
O say, what may it be ? "
" Some ship in distress, that cannot live
In such an angry sea ! "

" O father ! I see a gleaming light,
O say, what may it be ? "
But the father answered never a word,
A frozen corpse was he.

Lashed to the helm, all stiff and stark,
With his face turned to the skies ;
The lantern gleamed through the gleaming snow
On his fixed and glassy eyes.

Then the maiden clasped her hands, and prayed
That savèd she might be ;
And she thought of Christ, who stilled the waves
On the Lake of Galilee.

And fast through the midnight dark and drear,
Through the whistling sleet and snow,
Like a sheeted ghost, the vessel swept
Towards the reef of Norman's Woe.

And ever, the fitful gusts between,
A sound came from the land ;
It was the sound of the trampling surf,
On the rocks and the hard sea-sand.

The breakers were right beneath her bows,
She drifted a weary wreck,
And a whooping billow swept the crew
Like icicles from her deck.

She struck where the white and fleecy waves
Looked soft as carded wool,
But the cruel rocks, they gored her side,
Like the horns of an angry bull.

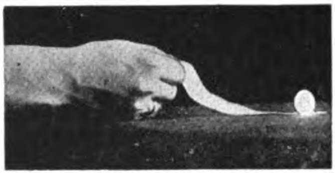
Her rattling shrouds, all sheathed in ice,
With the masts, went by the board ;
Like a vessel of glass, she stove and sank,
Ho ! ho ! the breakers roared !

At daybreak, on the bleak sea-beach,
A fisherman stood aghast,
To see the form of a maiden fair,
Lashed close to a drifting mast.

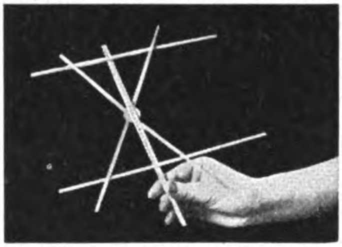
The salt sea was frozen on her breast,
The salt tears in her eyes ;
And he saw her hair, like the brown sea-weed,
On the billows fall and rise.

Such was the wreck of the Hesperus,
In the midnight and the snow !
Christ save us all from a death like this
On the reef of Norman's Woe !

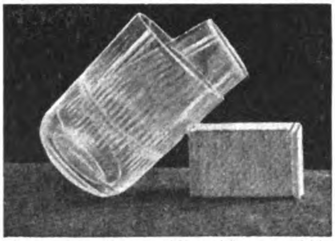
A SET OF SIMPLE TRICKS



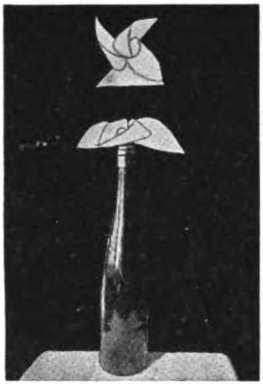
Cut a strip of paper, place it on the corner of the table, and make a silver dollar stand upon it upright in the manner shown in the illustration. The table should be quite level, and if it is so, the coin will remain erect without rolling. Then pull the paper away sharply and the coin will remain as it was.



With patience and a steady hand you can arrange straws in this position with a coin in the middle, so that you can hold the whole structure by one straw. Only five straws are used, and they support each other by the tension of their crossings. A nickel is a good coin for the purpose

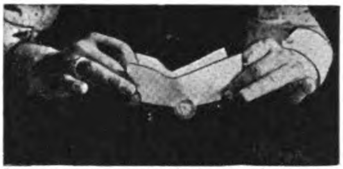


Place two tumblers in this position, one within the other, with mouth downwards, as shown. Blow into the larger tumbler and the smaller will be thrown out into your lap. Care should be taken to prepare for the sudden ejection of the smaller tumbler, or, as it comes out, it will fall upon the floor and be broken, and your trick will be entirely spoiled.

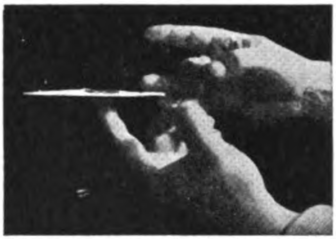


Take a square piece of paper and make a cut from each corner to near the middle. Bend over all the right-hand corners to the middle and put a pin through the lot into a cork as shown. Then blow upon the paper and you have a little windmill.

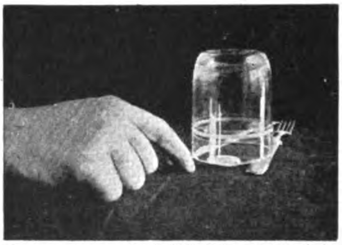
Place a few small pieces of copper and an equal number of small pieces of zinc inside a cut lemon, connecting the zinc and copper pieces with wire. To the last zinc piece and the last copper piece connect wires. In a few seconds you can feel the electricity generated by the acid of the lemon



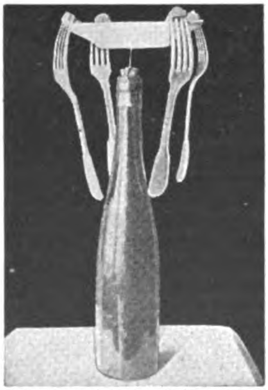
In a paper cut a round hole the size of a quarter. You can pass a fifty-cent piece through the hole by folding the paper double and bending the ends slightly upwards as shown. The action of bending the paper, when it has been folded, has the effect of widening the hole sufficient to allow the larger coin to pass without tearing the paper.



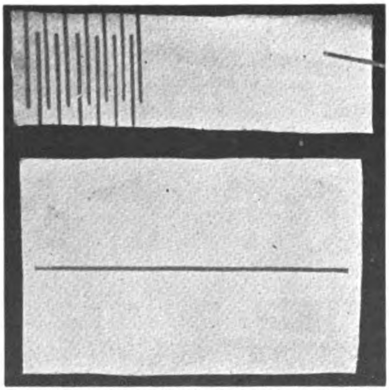
Take a square piece of card, place it on your finger-tip with a coin right in the middle of the card and right over the tip of the forefinger supporting the card. Flip the edge of the card sharply with the middle finger of the other hand and the coin will be left on your finger.



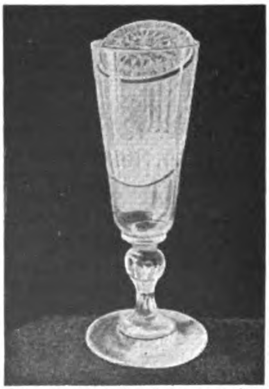
Place a coin on a tablecloth between two forks and under a glass as shown in the illustration. By scratching on the cloth just outside the glass, but not touching the glass, with the nail of one of the fingers, you can make the coin come towards you from under the glass. It progresses outwards by successive steps, and finally comes to where it can be removed without touching the glass.



Drive a pin into a cork in a bottle. Take four other corks and stick forks into their sides near the end. Then you can balance a plate on the pin by fixing up the corks and forks as shown.



Cut a slit down the middle of a piece of paper. Double the paper lengthwise and cut alternately from the two edges almost to the other edges, as in top picture. The paper is then in the form of a long, circular chain, through which a man can pass if the zigzags are opened out.



Take a tapered glass large enough to let a silver dollar sink down a little, and put a dime in the bottom. Blow sharply and the dollar will rotate and the dime will come out.

THINGS TO MAKE AND THINGS TO DO

A MAGIC LANTERN FOR PICTURE POSTCARDS

For winter evenings nothing is more interesting than a good magic lantern. Unfortunately, the lanterns that are bought at the stores have this disadvantage: they will show only slides that have been painted or photographed on glass, and these slides cost money; and even if the owner of the magic lantern has a good many of them, he soon gets tired of showing the same pictures over and over again.

Most boys have wished they could have a lantern that would show any sort of picture on the screen, and so we are going to tell them how they can easily make one for themselves.

1. Using the magic lantern that shows picture postcards

The magic lantern here described can be made out of an old biscuit-tin. It does not require glass slides, but it will throw on the white sheet in natural colours a big picture of anything that is put into it. When we have made it we can put picture postcards into it, or funny drawings that we can cut out of magazines, and it will throw them on the screen just as well as an ordinary magic lantern with glass slides.

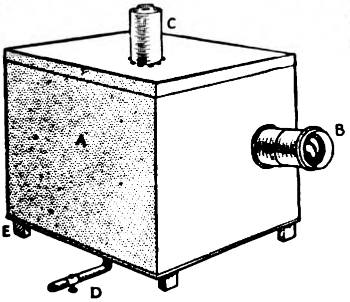
Picture 1 shows the lantern being used; the picture of an elephant in the lantern is being thrown upon the screen in front.

We can see the advantage of this at once. Probably we have hundreds of picture postcards or photographs that would look splendid if they were thrown on the screen. Well, we can use all these, and never get tired of this sort of magic lantern, because we shall always be getting new pictures for it of one kind or another. We can even show butterflies with it, or flowers.

If we like, we can put small living insects into this lantern, for it will not hurt them in the least, and then we can see them very much magnified, walking about in the most natural way on the white screen. We can see a fly, magnified enormously, running all over the sheet hung up to show the pictures on, and the audience will wonder how in the world it got there. We can do all sorts of surprising things with this magic lantern, but first we must see how to make it.

We get a large square cracker-box. Possibly we can find one in the house; if not, any grocer will sell one for only a few cents. This box will form the body of the magic lantern, as seen in picture 2.

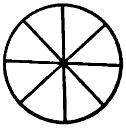
Now we must fix into it a lamp or a gas-jet that will give a bright light. Of course, the brighter the light, the brighter the pictures will be on the screen. An incandescent gas-mantle gives the best possible light, and one of these can really be fixed more easily than a lamp. We can buy an incandescent gas-burner complete for about two dollars, and any gas-fitter will supply a short bracket of the kind shown in the illustration. We have then only to make a small hole in the bottom of the cracker-box, put the burner inside and the bracket underneath, and then screw them together. When this has been done, the burner will be fixed in the required position quite firmly.



This is the lantern complete. A is the body of the lantern; B is the sliding lens; C is the chimney; D is the gas-bracket; E marks the feet on which the lantern stands.

It will be necessary now to make four feet for the lantern to stand upon, as the gas-bracket at the bottom makes it uneven. Little cubes of wood, about two inches high, will form the feet. If we can find any wooden "bricks" in an old toy-box, these will do splendidly. We have only to place one at each corner of the box, to drive nails through the tin from the inside, and the feet will be firmly fixed in a few minutes.

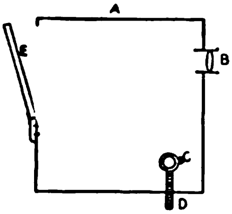
Now we must get a lens for our lantern. These are sold at the shops where magic lanterns and cameras are kept. We had better explain exactly what we want the lens for, and the man will understand. The lens should be mounted in a brass tube that slides backwards and forwards in another tube, so that we can focus the picture on the screen. A good one costs between one and two dollars.



3. Opening for the lens

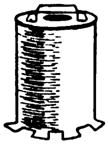
Now we must cut a hole in our biscuit-box, and fit the lens in the position shown in the illustration. This is quite easy, if we get from a tool-shop a small tin-cutter. With one of these we can cut the tin in a few minutes, and it will also be useful later on. The tin-cutters are merely strong scissors, and a pair can be purchased for about fifty cents.

When the hole is cut out, fit the lens into it. If the lens has a "flange," that is to say, a flat rim, with holes for screws, this will be very easy. All we have to do is to bore holes through the tin, and then fix the lens with strong brass "paper fasteners." If it has no flange, the simplest way is to cut eight slits, all meeting in a point, as shown in figure 3. Then bend the pointed pieces of tin inwards, and they will form a support for the lens tube.



4. Diagram of the lantern looking from above

We now have the gas-bracket and the lens in position. The next thing to do is to make a door at the back of the lantern, so that we can put the pictures in. Cut an oblong hole, about the size of a postcard, not in the middle of the box, but on one side opposite the lens, as shown by diagram in picture 4. When we have done this make a wooden door with hinges, as shown in the picture.



5. Chimney made from coffee-tin

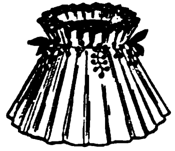
The lantern is now complete except for the chimney. This can be made out of an old coffee-tin. Cut a hole in the lid of the box exactly over the gas-bracket. Then make five or six cuts round the top of the coffee-tin, each about one inch long, bend back the pieces of tin, and then you will be able to fix the chimney to the top of your lantern with brass paper fasteners. One glance at picture 5 will make all this clear. At the bottom of the coffee-tin, which is now the top, we must cut a hole as big as a half dollar, and fix over it a flat piece of tin with paper fasteners. This opening will allow the hot air to escape, but not the light. A few small holes must also be made in the back of the lantern, so that air may come in, otherwise the gas will not burn properly.

Now the whole lantern is complete, and if we have done everything neatly it will look quite nice. If we wish it to look particularly smart, we can give it a coat of Brunswick black. When we want to try our lantern, we fix a white sheet over one wall of the room. Then place the lantern on a table about eight or nine feet away, and connect the gas-burner by means of an india-rubber tube with the ordinary bracket on the wall. Put on the incandescent mantle, light the gas, and then put the lid on the lantern.

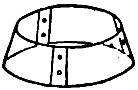
Now open the door at the back, and fix a picture postcard to the wood with drawing-pins, and the moment the door is closed a large picture of the postcard will be thrown on the white screen. We must slide the lens backwards or forwards until the picture on the screen is quite sharp, and then we can show just as many more postcards or other pictures as we please. By the way, whatever sort of pictures are placed on the door, remember to pin them on upside down. They will appear right way up on the screen. We have already seen that we can show living insects on the screen with this lantern. The way to do this is to make a small cardboard box with a glass lid to hold the insect—the fly, or beetle, or spider, or whatever it is. Then put the insect into the box, and, when ready, open the door of the lantern and merely hold the box at the opening. Instantly the magnified image of the insect crawling about appears on the screen. It will not hurt the insect to be held up to the light for a few minutes; but do not leave it imprisoned and then forget all about it.

A PRETTY PAPER SHADE FOR A CANDLE

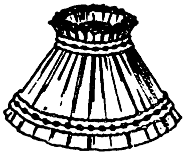
HERE is an excellent idea for a novelty for a candle shade. Buy a small roll of coloured crinkled paper and a talc, which can be bought from any large stores; cut two strips of the paper about 23 inches long and 4½ inches wide. Lay them together so that the paper is double; gather it all round one end with a needle and thread, about an inch from the top. Draw the paper up to the size required for the top of the talc, which we see in picture 1. Wrap the end over and fasten off at the gathering. The talc has three sets of holes, through which we can stitch it to the paper shade, to keep the shade firm and a good shape. The shades may be trimmed in many ways. The one shown in picture 2 is of rose-pink paper, trimmed with lilies-of-the-valley, and that in picture 3 is simply ornamented with frills of the paper. If carefully blended, two shades of paper can be used with good effect.



2. Shade trimmed with flowers



1. The talc

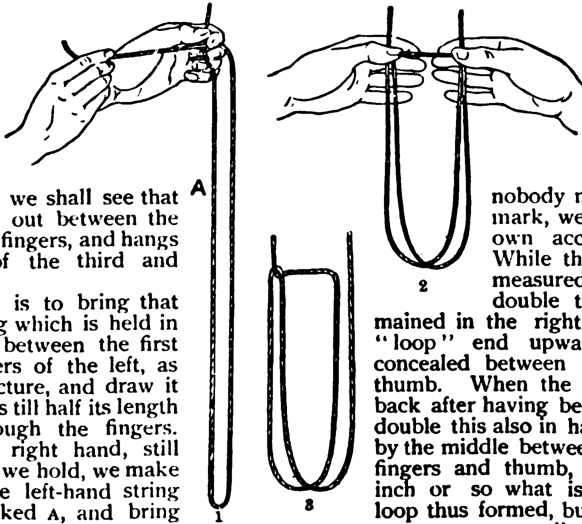


3. Shade trimmed with paper frills

CUTTING THE MAGIC STRING

This is an old trick, but it is a very good one, and, improved to the form we are about to describe, it is very little known. It can be performed just as well by a girl as by a boy, and it has the great advantage of requiring no previous preparation. When we have once acquired the necessary skill, we can perform it at a moment's notice, all that we need being a pair of scissors and a piece of string.

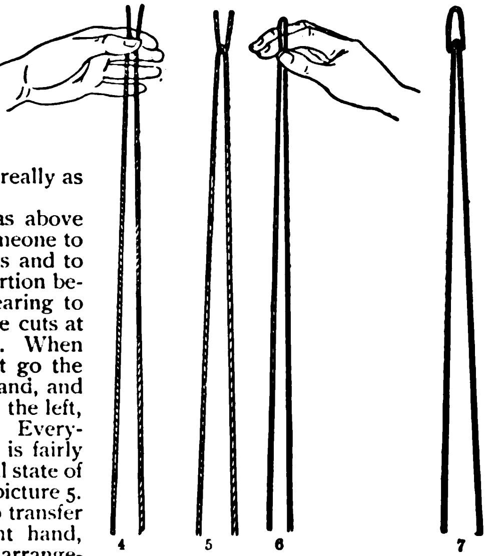
The string should be about four feet long. We begin by taking one end of it in each hand between finger and thumb, the rest of the string hanging down between them. But the end in the left hand is not held quite in the same way as the other, though no one not in the secret would notice any difference. If we look at picture 1 we shall see that the string passes out between the second and third fingers, and hangs down outside of the third and fourth ones.



Our next step is to bring that part of the string which is held in the right hand between the first and second fingers of the left, as shown in the picture, and draw it towards ourselves till half its length has passed through the fingers. Then with the right hand, still retaining the end we hold, we make a "grab" at the left-hand string at the point marked A, and bring it up so as to lie level between the hands, as shown in picture 2. To anyone looking on, it seems as if you had merely gathered up the string in a double loop, but it is really as shown in picture 3.

Holding the string as above described, we ask someone to take a pair of scissors and to cut it in halves, the portion between the hands appearing to be the middle, and he cuts at that point accordingly. When he has done so, we let go the string with the right hand, and let it hang down from the left, as shown in picture 4. Everybody imagines that it is fairly cut in half, but the real state of things is as shown in picture 5.

Our next step is to transfer the string to the right hand, not disturbing its arrangement, but taking hold of it a little higher up, so that the upper ends, as well as the point where the two pieces of string cross each other, shall be hidden by the fingers. Asking someone to take hold of one of the long ends, we wind the rest of the string round our own left hand. This draws off the loose bit into the other hand, and when we again unwind the string it is found to be all in one piece, as at first. The little bit remains concealed in the right hand.



The trick of the magic string

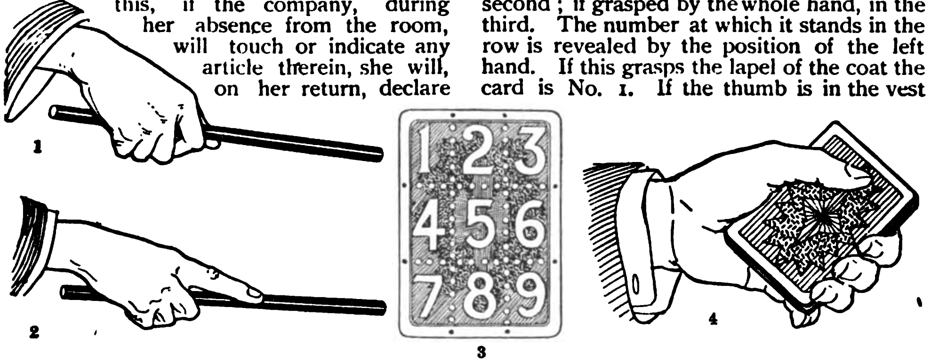
But we have not yet finished. Somebody—one of those uncomfortable people who know, or think they know, everything—may very probably say, "Oh, yes; I know how *that's* done. The string wasn't really cut in half. You only had a bit cut off one end." "Oh, you think so?" we retort. "Then I will do it over again, and this time you may measure the string before and afterwards." If nobody makes such a remark, we volunteer of our own accord to do this. While the string is being measured, we secretly double the bit that remained in the right hand, with the "loop" end upwards, keeping it concealed between the fingers and thumb. When the string is handed back after having been measured, we double this also in half, and, taking it by the middle between the right-hand fingers and thumb, draw up for an inch or so what is apparently the loop thus formed, but is in reality the little loop made of the short bit. Picture 6 shows how the string now looks, and picture 7 the real state of things. We let someone cut through the loop, and wind the string round the left hand as before. It is again found restored, and when measured will, of course, be found to have lost none of its length.

This is not an easy trick to describe clearly in print, but if we follow the instructions with the string in our hands, and study the pictures, we shall soon learn it. And it is worth learning, for it is a genuine sleight-of-hand trick, and such tricks are the most magical of any, and make a good impression.

THE MYSTERY OF TELEGRAPHING THOUGHT

We have all been baffled at times by the wonderful way in which a lady sitting on a platform at one end of a hall has been able to tell what a gentleman at the other end has in his hand, and this strange system of "thought-reading" is really very simple. The boy or girl who would learn to play this magical duet must practise diligently till each is perfect in the part they have to play—that is all.

Let us suppose that the duet is played by a boy and his sister. When the eventful night comes the boy introduces the lady as his "medium." Being a medium, she naturally possesses a certain amount of the thought-reading faculty. To prove this, if the company, during her absence from the room, will touch or indicate any article therein, she will, on her return, declare which article it was. There are several ways by which the performer may impart the necessary information. One of the simplest is to arrange that when he asks for, say, the sixth time "Is it this?" the question is to be answered "Yes." For a second attempt it may be arranged that the eighth or ninth question shall furnish the clue.

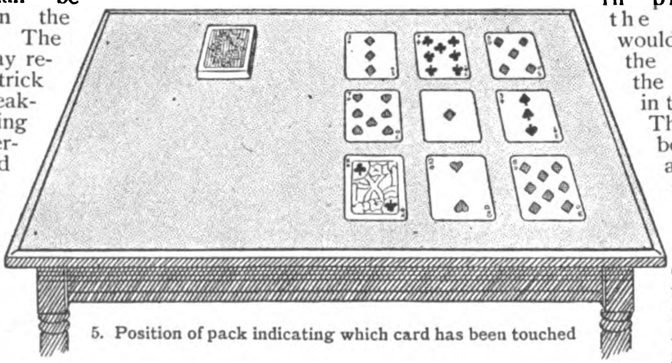


The methods of telegraphing thought with a magic wand and a pack of cards

Another plan is to agree that whenever the performer's question refers to a four-legged object, say, a chair or table, the one next following shall be answered in the affirmative. The performer may repeat the trick without speaking at all, using a ruler or paper-knife as wand or pointer, merely touching or indicating various objects in succession. Where he points with a "wand," as above, it may be agreed that, so long as the performer holds the wand as shown in picture 1, the medium is to answer "No" to all his questions; but if the forefinger is shifted so as to lie along the wand, as in picture 2, the answer is to be "Yes." The same principle may be carried a good deal further, as in the following capital trick. During the absence of the medium a pack of cards is first well shuffled; a great point should be made of this, because it has nothing whatever to do with the trick. Nine cards are then dealt face upwards on the table in rows of three each. One of these is "touched" by one of the company. The medium, on her return, after a little cogitation, names the card.

Here the row in which the card stands is indicated by the manner in which the performer holds the wand. If between the forefinger and thumb only the card is in the first row; if encircled by two fingers, in the second; if grasped by the whole hand, in the third. The number at which it stands in the row is revealed by the position of the left hand. If this grasps the lapel of the coat the card is No. 1. If the thumb is in the vest pocket, No. 2. If the hand hangs down by the side, No. 3.

Another method of telegraphing is by the position of the performer's thumb on the back of the unused cards. For this purpose you must imagine the surface of the top card as divided into nine portions, numbered as indicated in picture 3. The performer indicates the card touched by holding the pack so that his thumb shall rest on that part answering to it in position. Supposing it held as shown in picture 4, the medium would know that the card was the middle one in the first row. The trick may be repeated in a still more surprising way. Suppose the nine cards laid on the table as in picture 5. A similar group is imagined lying side by side with it, and the pack is left by the performer in that position which in the imaginary group corresponds with the card touched. Thus the pack laid as in picture 5 would indicate that the middle card in the top row is the one.



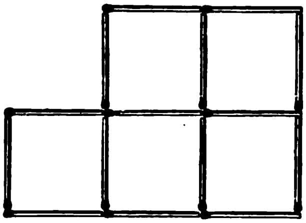
5. Position of pack indicating which card has been touched

WHAT TO DO WITH A BOX OF MATCHES

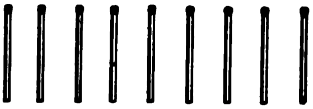
The problems given below may be performed either with matches or pins, provided the matches or pins are all of the same length. It will be much safer if the matches used are the safety kind that strike only on the box.

1. Take eleven matches and place them so as to make nine of them.

2. Arrange fifteen matches so as to form five squares of equal size as seen in the picture, and then remove three matches so as to leave only three of the squares.

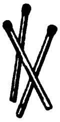


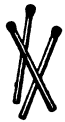
3. Take nine matches and place them so as to make three dozen of them.



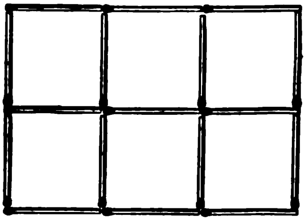
4. Take three matches and place them so as to make four of them.

5. Place three matches in such a position that they will make six.

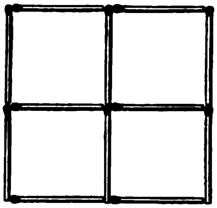




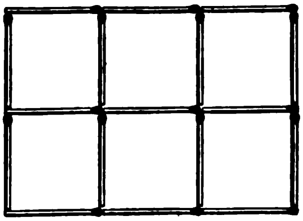
6. Arrange seventeen matches on the table so as to make six squares as shown in the illustration, and then by taking away five matches leave three squares only.



7. Arrange twelve matches on the table so as to make four squares as shown in the picture, then after removing four matches place them so as to make three squares of the same size as the first squares.



8. Arrange seventeen matches on the table so as to form six squares as shown in the picture, and then take away six matches so as to leave only two squares remaining.

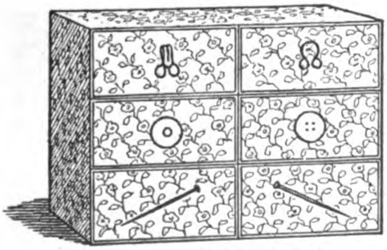


ANSWER TO PROBLEMS ON PAGE 1818

A MATCH-BOX CHEST OF DRAWERS

Half a dozen empty match-boxes will make a dainty little chest of drawers to stand on a work-table. If you are not fond of needlework, it will make a useful present.

Besides the six empty boxes, which must all be of the same size, you will want a piece of coloured material, such as silk, brocade, linen, or cloth, some paste and a brush.



The chest of drawers finished

Cut twelve little pieces of material the same size as the end of a box; take each box out of its cover, and, very neatly, paste one of your little pieces over each end of it. When they are all dry, put the boxes back into their covers, and place them two by two above each other, with paste between.

Then cut a piece of material (which need not necessarily be the same colour as that which you pasted over the ends of the boxes) exactly the same width as the chest is from back to front, and long enough to go right round it, with the ends just overlapping.

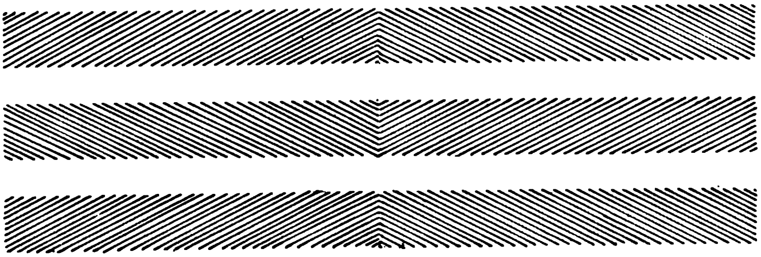
Lay this piece straight out on the table, and paste the whole of it very carefully. Then put the top of the chest in the centre; pull one piece tightly round the side to the middle of the bottom of the chest, and press it firmly.

Do exactly the same with the other piece, making the end overlap the piece already on. The two top drawers can be for hooks-and-eyes, so take one of each, and on one drawer sew a hook, on the other an eye, just in the centre. One of the two middle drawers might have linen buttons, the other brass buttons, and the two bottom drawers black and white pins.

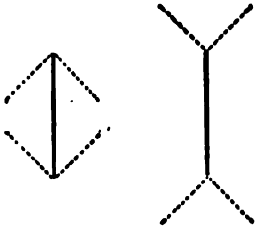
Do not put on too much paste, and don't let any get on to the front of the material, and you will find that when it is quite dry the paste does not show through at all.

Continued on p. 231

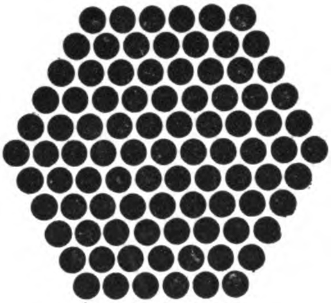
CAN WE ALWAYS BELIEVE OUR OWN EYES?



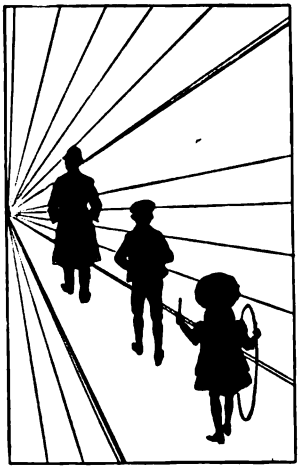
If you fix your eyes on the two white spaces between the lines it will appear as if the top space becomes wider at the ends, and as if the bottom space becomes wider in the middle. But both lines are perfectly straight.



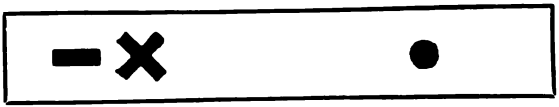
Which line is the longer? The black line on the right appears longer than the line beside it, but both lines are exactly the same length.



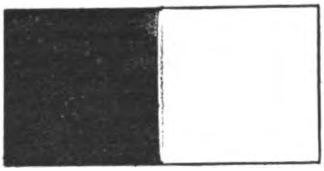
This shows how a circle appears to have sides and corners. These black spots, if looked at intently, seem to have six sides, like a honeycomb, but they are all quite round.



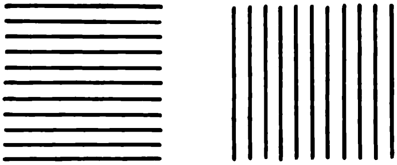
Who is the biggest? The policeman, most people would say. But the policeman is really the smallest, and the little girl is the biggest. This curious effect was first used by a clever artist for Pears' Soap.



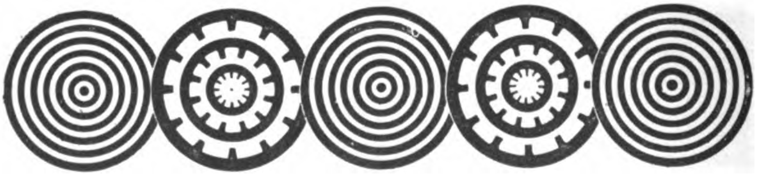
There is a blind spot in both your eyes—part of the eye, that is to say, is blind. You can prove this by closing your left eye and looking at the X with your right. Hold the paper a foot away, and draw it towards you. Though looking at the X, you will see the spot too, but at a certain point the spot will disappear. By drawing it still nearer to you, you will bring the spot into view again.



Which square is the larger? Most people would say the white, but the white is smaller than the black.



One of these sets of lines looks higher than it is wide, and the other wider than it is high, but both are square.

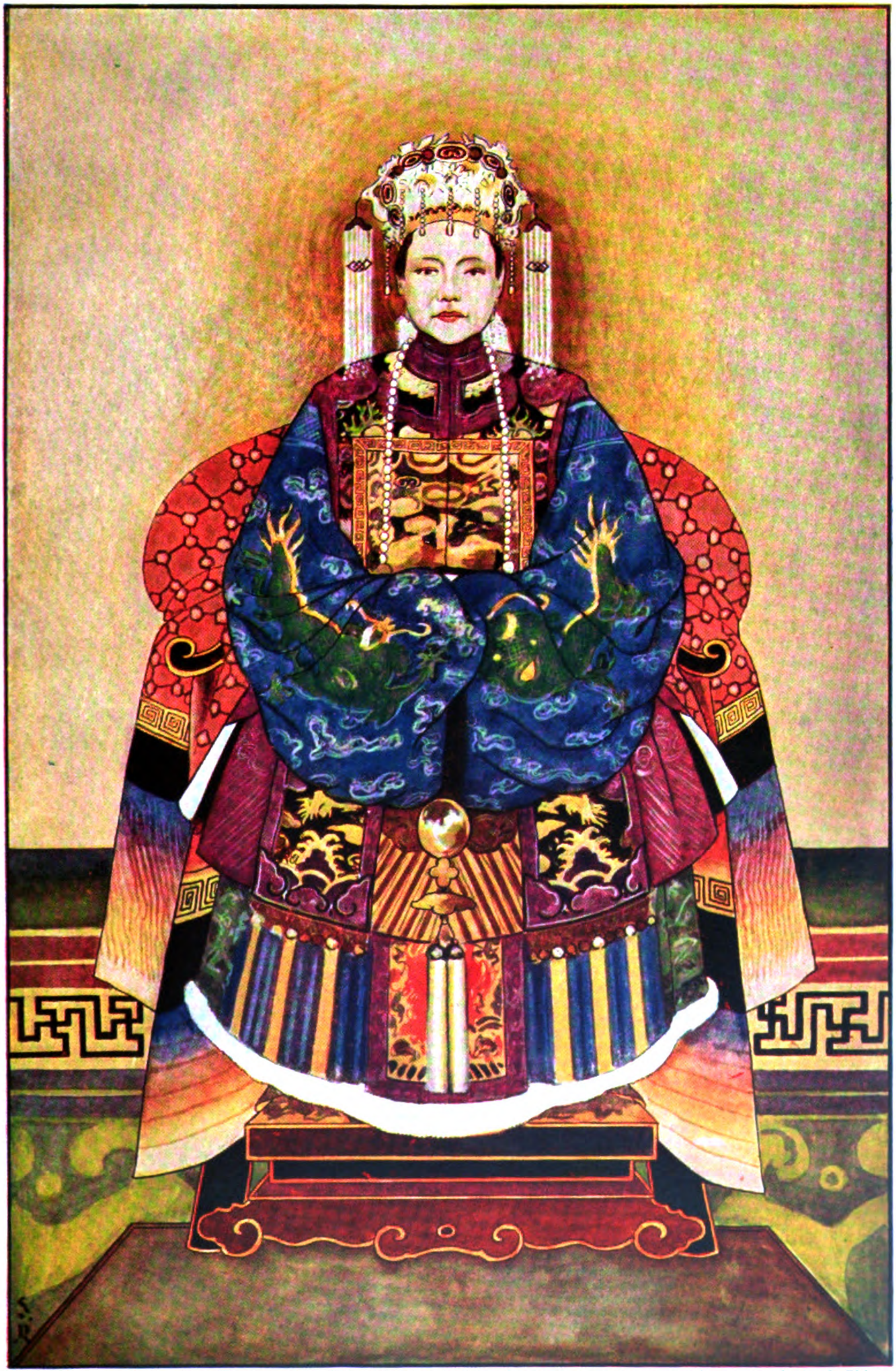


Turn the page round and round to the left. The plain rings will appear to revolve rapidly to the left, and the others to go slowly round in the opposite direction.

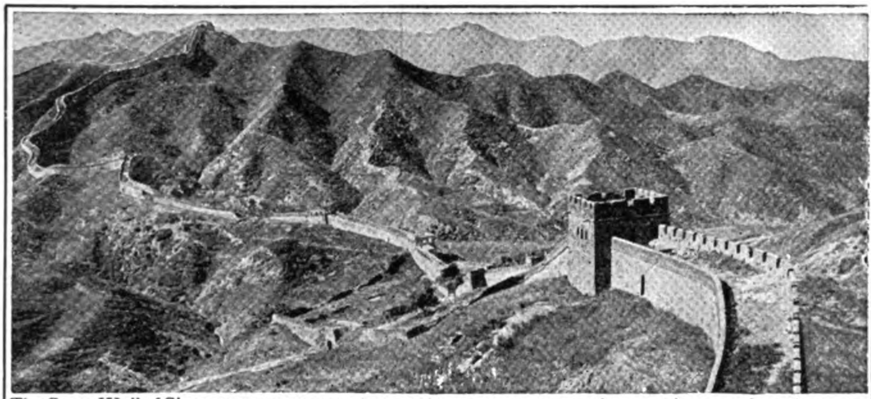
The poet was perfectly right when he said that things are not always what they seem. We cannot always believe our own eyes. Our vision of things is never quite perfect. There is always a little error in our sight, and this page shows us how we may deceive our eyes and make them believe that things are not what they are.

CONTINUED ON PAGE 333

A CHINESE EMPRESS ON HER THRONE



This picture of the late Empress Tze-hsi, the slave girl who rose to rule an empire, is typical of China, the land of all that is picturesque. The gorgeous costume of dazzling colour is a true emblem of Eastern pomp, which is well represented by this able woman, who was once described as "the only man in China."



The Great Wall of China was built more than seventeen centuries ago to keep out invaders from the north. It is about 1,500 miles long, and in its course scales precipices and tops the craggy hills, as shown here.

THE CHINESE EMPIRE

THE OLDEST LIVING NATION OF THE WORLD

The Empire of China covers one quarter of Asia, from the Pamirs to the Pacific, and from Siberia to India. The mysterious and wonderful mother country, China proper, lies between its great provinces of Manchuria, Mongolia, and Turkestan, and the vast Pacific Ocean. In size China proper is about six times larger than the State of Texas, and its face is crossed by the outlying eastward ranges of mountains running from the great central heights, and by the immense rivers fed by the snows of Tibet, and joined by a network of streams on their long journey to the ocean.

It is estimated that over 300,000,000 people live in China, in its great cities and fertile plains, and on the banks of its waterways.

Among the treasures of many of our American homes are to be found curiosities brought by sailor friends and relations from this wonderland of the Far East, such as delicate embroideries in shining silks of gorgeous colours, dainty carvings in ivory, and exquisite little bits of fine porcelain or china. And as we have looked closely at the regular stitches in the beautiful fabric, we have seen that there is no untidy "wrong side" in Chinese work. We have wondered at the seemingly impossible puzzle of the ivory balls carved one inside the other, or at the unusual patterns on the thin little cups, and we have tried to picture to ourselves the far country whence the treasures came, and the patient and clever workers who made them. Perhaps all that we have succeeded in calling before our minds is the strange hairdressing of Chinese men, and the tiny feet of Chinese women, upon a misty background of an unknown land of flowers, with gracefully curved buildings and willow-pattern plate landscapes.

If we have gone to our map of China for help, very possibly we have been dismayed and discouraged by the great number of difficult names upon it, and queer ones indeed they seem to us, in a language so absolutely different from our own. So perhaps it will help us in our quest of a closer view of China and its people to learn a few words of Chinese first, and then, at any rate, we shall understand what some of the names mean, which will give us a much better chance of remembering them, difficult as they are.

In this veritable Land of Mighty Streams, ho, kiang, and kong, all mean river; chan, or shan, and ling, stand for the mountains between which the rivers run, or through which, in some parts, they force a way between mighty gorges; pe, nan, tong, or tung, and si, indicate the points of the compass, north, south, east, and west; hoang, or hwang, is yellow, the imperial colour of China; pei, is white; fu, or foo, and king, mean town or court; hai, the sea; chian, heaven, and so on.

Knowing a few words like these, we can easily find the mountains of the east, north, and south: Shan-tung, and the Pe-ling and Nan-ling ranges. The two last shut in the basin of China's greatest and most important river, the Yang-tse-kiang. Over 3,000 miles lie between its sources in the heights of Tibet and its mouth in the Pacific Ocean. It makes a magnificent waterway into the heart of the country, wide and deep enough for steamers to ply for a thousand miles through the rich plains of Central China, which the river itself has done much to form, by bringing down fertile mud, as the Nile does along its banks in Egypt.

THE RIVER OF CHINA'S SORROW AND THE TERROR OF ITS FLOODS

In its upper courses, separated from the lower by grand gorges which remind us of the Iron Gate on the Danube, it passes through a rich district of red earth—as large as England and very thickly peopled. There are lakes in the basin of the Yang-tse-kiang which act as reservoirs in the time of heavy rains, so that its floods are not so disastrous as those on the Hwang-ho, or Yellow River, which drains through Northern China. "China's Sorrow" is one of the names of this river, so dreadful are the floods when it bursts its banks and submerges the surrounding country and towns. It is not navigable for long distances, like the Yang-tse-kiang, but on its banks, and in caves in its cliffs, live many of China's millions.

Water is not the only gift the inland provinces send to the mother country; another is sand--yellow sand—that has been constantly blown by the strong winds from Mongolia over parts of Northern China for centuries, till valleys have been filled up by deep beds of it, and the low hills covered with it. So here we have a yellow land with a yellow river, cutting its way through the soft soil, making deep cliffs on each side, and carrying its thick, yellow, sandy waters onwards, until they pour by ever-changing mouths into a yellow sea. One of the titles of the great Emperor of China is "Lord of the Yellow Land."

THE WONDERFUL YELLOW SOIL THAT GROWS SEVERAL CROPS A YEAR

The yellow basin of North China is even more fertile than the red basin of Central China, several valuable crops being raised in a year on the "loess" soil, as it is called.

The Si-kiang, or West River, drains Southern China, rising in the eastern spurs of the Tibetan heights, and making its way through tropical forests, past mountains with treasures of every sort of mineral, and fields with crops that require a hot and moist climate. It is from Southern China principally that so many Chinese emigrate to find work in different parts of the coast of the wide Pacific.

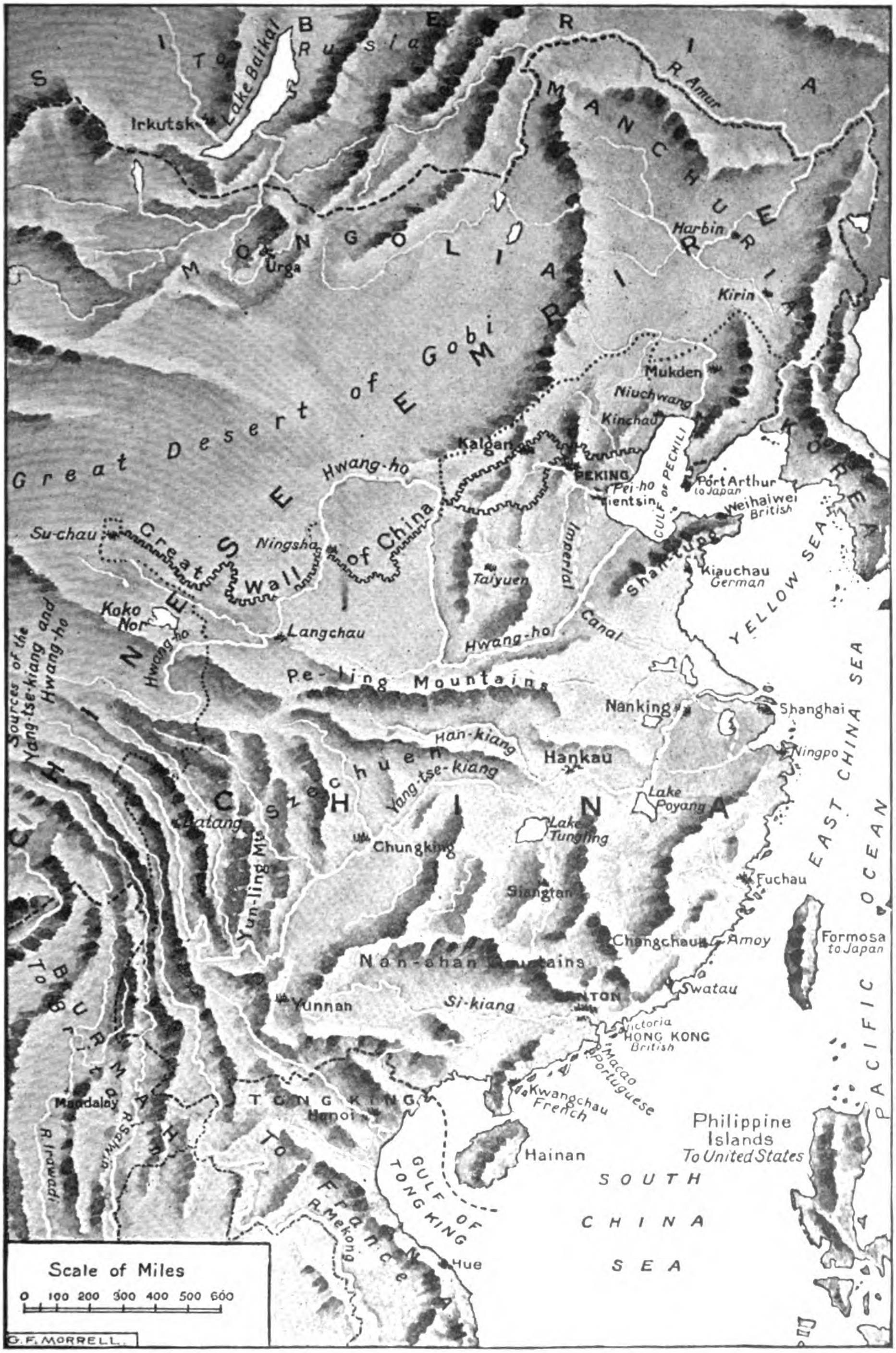
We have often imagined the hum that rises from busy districts and towns in other countries, but from China—from that vast hive of human industry between the solemn, silent central mountains and the deep, wide sea—it seems as if there must be one continuous and mighty buzz from the whole country, so close are the great cities, so many are the millions of people living and working on the fertile plains.

And this buzz of multitudes is no new thing, as it is in our own country, where great industrial centres are scarcely a century old; neither is it caused, as it is with us, by the whir and thump of machinery and the noise of the iron horse on his journeys to every corner of the land. Railways and machinery are, comparatively speaking, only just starting in China, the oldest living empire in the world.

THE LAND OF ETERNAL SAMENESS WHERE CUSTOMS NEVER CHANGE

For thousands of years her people have been steadily working, growing in numbers and changing rulers, suffering the horrors of war and enjoying the blessings of peace, but always busy in

THE EMPIRE FOUR THOUSAND YEARS OLD



This map shows the extent of the great Empire of China, that is said by some historians to have existed for more than 4,000 years. It has remained practically unchanged all that time, but is now awaking everywhere to new life. The various places round the coast that belong to the different European nations are marked in the map.

the same old ways, making the same things, cultivating the ground on the same methods for centuries, learning the same lessons in the same language, and competing in the same examinations to fill the same Government posts.

It is difficult for us who are all for progress and new ideas, and dislike standing still, to understand this steady keeping to old ways. Two thousand years ago our ancestors were still in the wilds of Germany—very rough persons, who would find us, their descendants, very much changed in language, manners, and dress from themselves.

Now, the written history of China goes back for 4,000 years—nearly twice as long as that of Europe—so that when Europe was just beginning to make for civilised ways and thoughts, the Chinese nation was 2,000 years old. But she lost the advantage of her start of 2,000 years by standing still, going to sleep, and keeping herself to herself for centuries while the young Western nations were forging ahead, developing governments and education and inventions.

THE LONG SLEEP OF THE CHINESE PEOPLE AND THEIR HATRED OF NEW IDEAS

There are many reasons that account for the long sleep. We will only speak of two that will help us to understand the history of this country, so unlike our own. One is that the Chinese have always greatly revered their parents and ancestors, going so far as to make it a first duty to carry on the work of life in exactly the same way that their forefathers had handed down.

Another reason is that, with few exceptions, the Chinese have stayed at home within the limits of their own country. Then, as they also seldom encouraged foreigners to visit them—indeed, they rigidly kept them out, as a rule—no new ideas of progress and reform, no new knowledge of outside discoveries and inventions, could penetrate the wall of reserve that shut in their heavenly, or celestial, kingdom, so superior, as they believed, to the rest of the earth. And, as time went on, they hated anything new or foreign more and more. But that is changing now.

Some say that ages ago the ancestors of the Chinese came from the Tarim basin and settled on the yellow loess-beds, where it was so easy to grow food.

Anyway, here they lived, advancing in civilisation for long, long years, before they spread across the forest-covered mountain ranges which separate the basin of the Yellow River from that of the Yang-tse-kiang. Here, too, the tribes flourished and grew, and in time united under one ruler; the government became more settled, and all sorts of arts developed, such as the rearing of silkworms and the weaving of silk. This has ever been one of China's greatest and most profitable industries.

CONFUCIUS, THE GREAT TEACHER WHOSE WORDS ARE LAW TO MILLIONS OF MEN

Nearly twenty-five centuries ago a great teacher and leader arose, named Confucius, who, during his wandering and hard life, tried to find out how best a man could do his duty to his neighbour, and how best he could learn to govern himself. His teachings have been law to countless millions of his fellow-countrymen, his temples are found all over China, and his books have been the foundation of all learning through the centuries—for Confucius collected and set in order the history of the empire, and inspired a great many books in which his teaching is set forth.

A few hundred years after his death, a prince of China reigned who ordered a great burning of the books of Confucius, and cruelly treated those who tried to keep them. One punishment was to send them to labour on a great wall that he was building, right across the north of China, to keep out the Mongolian horsemen, who were for ever descending on his country. Thirty feet high, fifteen feet wide at the top, faced with granite, with many towers of defence, this wonderful wall runs over hill and valley, across sand and river, up the face of the rocks, for 1,500 miles along the north border-line of China. This wall still divides China from Mongolia; but it did not keep the Mongols out, any more than the Roman wall across Britain kept out the Picts and Scots.

THE GREAT SILENT DESERT WHERE CHINA'S GREAT WALL LIES BURIED

The last explorer to return from Central Asia is Dr. Stein, and the discoveries he made there are of importance and interest in connection with this great wall.

For miles and miles, as far as the eye can see in the basin of the Tarim River, there stretches sand—nothing but dry,

MEN, WOMEN, AND CHILDREN OF CHINA

A woman and child of Macao, a Portuguese settlement in China.

Chinese girls of various ages engaged at embroidery work in a mission school at Canton.

A young lady of Canton dressed in her best walking costume.

A choir of Chinese boys at a mission school. The study of expressions on the faces in this picture is very interesting, as only two of the boys in the group knew that they were being photographed.

A Chinese woman with tiny feet. The cruel custom of crushing the feet of girls has been in fashion for 900 years.

A group of Manchu gentlemen. The Manchus conquered China in 1644 and founded the present line of emperors. They introduced the wearing of pigtails into China.

A typical Manchu lady. The Manchus are still the ruling class in China, most Government officials belonging to that race.

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parched sand, that has fought and conquered mankind, overwhelming towns and villages, and sweeping away a flourishing civilisation. Of life there is practically no trace. Men have fled before those advancing grains of sand, that they were powerless to check; animals have died. Only one or two plants are able to exist in those desolate wastes. It is a land of sand—and silence, of which some pictures are found in a later volume of this work.

In these awful wastes, beneath the numerous sand-dunes, Dr. Stein made some interesting discoveries. He found that the Great Wall of China, which hitherto was thought to end at the foot of the Nan-Shan Mountains, does not end there at all. Far away to the west in the Tunghwan Desert he found the remains of a great wall, with watch-towers at intervals of two or three miles, that practically joins the wall at the foot of the Nan-Shan Mountains.

This, he believes, is the true Great Wall of China, and the wall which we have always looked upon as the great wall is, apparently, much more modern.

THE HISTORY OF A RACE THAT IS BURIED UNDER THE SAND OF CENTURIES

There, from those silent and deserted houses and watch-towers, Dr. Stein has excavated that terrible sand, little by little, and his labour has been well repaid. Wooden slabs, with carefully-wrought symbols and clay seals, private letters, official documents, frail materials of cotton and silk, and ancient paper, have all been recovered from the sand under which they have lain for many centuries, and these documents, when translated, may give us a history of the long-vanished race which once occupied the land that is now a great sandy waste, where life is insupportable.

We can imagine with what fears these ancient people saw the sand creeping nearer and nearer; how they battled with it valiantly, and tried to keep it from their homes; and how, at length, the sand slowly crept up to the houses and cottages, and into the rooms, driving the inhabitants forth, and gradually covering the entire place in a thick layer. But although the sand has destroyed, it has also preserved, and the relics which have been found will throw much light upon those ancient and deeply interesting times. More than a hundred years before the birth of Christ regular trade was opened up with Central Asia by China, and caravans began to wind along the routes from one oasis to another across the deserts, through the passes of Mongolia and Turkestan, to Tibet, carrying goods for trade by the infinite labour of men and dumb animals.

THE GOLDEN AGE OF CHINA WHEN TEMPLES WERE BUILT AND BOOKS WERE PRINTED

Later, the empire suffered from many disturbances and divisions, and the struggles among several small rulers to be first and foremost. It was during these centuries, about the times when the Angles and Saxons were seeking their new homes across the North Sea, that the Buddhist religion took hold in China, though it had been introduced from India some centuries before. Temples were built all over the country, to house the thousands of images that were brought by the priests and monks.

The three centuries after this are considered by the Chinese as one of the most glorious periods in their long history. Books and authors, schools and colleges, examinations and degrees, occupied a great place in public life. About the time when King Alfred was setting scholars laboriously to work with their pens and paint-brushes to copy manuscripts, Chinese records mention the printing of books by wooden blocks. About this time, too, an immense encyclopædia was written. The fame of this learning and of the gorgeous palaces and riches of China was spread to Europe, chiefly by Arab traders, and ever since the romance and mystery of China has attracted the imagination and longing of the West.

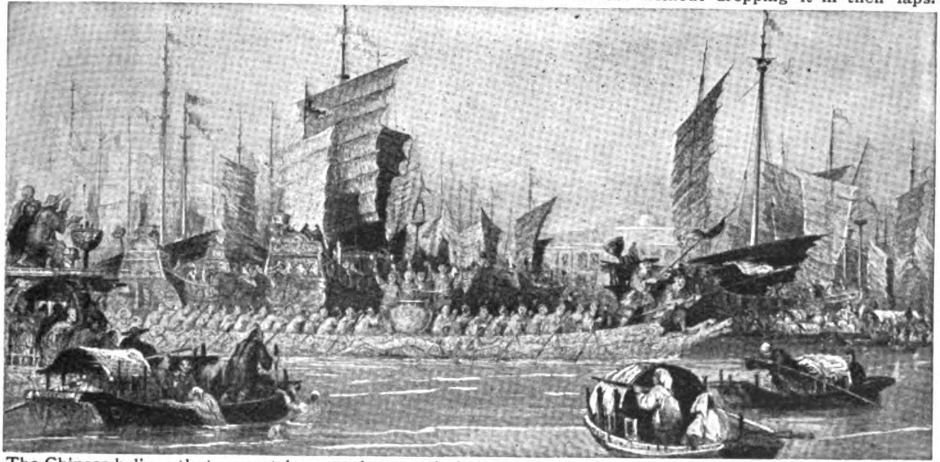
HOW THE DOOR WAS OPENED FOR EUROPE TO GET ITS FIRST PEEP OF CHINA

But it was not till the thirteenth century that the famous Marco Polo opened the door for Europe to get a passing view of the wonders of the dim and mysterious land of the Far East.

Early in that century the Mongols had gradually been getting more and more power on the borders of Central Asia and in the north of China. When the great leader Jenghiz Khan, the "Greatest of the Great," flashed over Western Asia and ruled over an empire stretching from the China Sea to Russia, some of the barriers that had hitherto

MANNERS AND CUSTOMS OF THE CHINESE

Here we see a Chinese dinner-party. Instead of knives and forks the Chinese use chopsticks to pick up their food, and they are very skilful in conveying the food to their mouths without dropping it in their laps.



The Chinese believe that a great dragon rules over the heavenly bodies, and at eclipses he is supposed to swallow the sun or moon. To appease him a ceremony called the Festival of the Dragon-boat is held, as shown here.

This picture shows a Chinese tea-house of the better class in Shanghai. Here wealthy Chinamen pass their time, chatting over the teacups and discussing business. Some of these houses are fitted up very elaborately.

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prevented entry into China were swept away. The huge empire was divided at his death among his sons, and a good deal of intercourse followed between China and Persia, Tibet and Mongolia.

THE GREAT MONGOL EMPEROR WHO MADE PEKING HIS CAPITAL

It was the grandson of Jenghiz Khan, Kublai Khan, who welcomed Marco Polo so kindly to China, and sent him on so many missions to the wild provinces on the borders of Tibet and other distant parts of the empire. Deeply interesting is the account of Kublai's reign by Marco Polo, as well as the writings of other travellers who seized the opportunity of exploring the heights of the Pamirs and the Tarim basin; and some even crossed the Hwang-ho into China itself.

Kublai added Southern China to his dominions, and made his new capital at Peking, the Court of the North. This great soldier proved equally great as a ruler, for he encouraged education and helped China in many ways.

His grandson, Timur, or Tamerlane, was the last of these great Mongol rulers. He gave an order that Confucius should be held in great respect. After his death, rebellions and murders of emperors, great misgovernment, and other troubles brought the rule of the Mongols to an end. In the fifteenth century the Chinese drove them across the Great Wall to the Altai Mountains, and Mongolia became a province of the empire under the Chinese Ming family, or dynasty, of emperors, which lasted nearly 300 years. There were troubles at home and abroad during this time, difficulties with the Mongols and the Japanese, and, most important of all, the door which hid the Celestials from the Western "barbarians" began to open just a little. The Portuguese and Spaniards appeared in China in the sixteenth century, and a Chinese fleet sailed as far as the Red Sea.

A WONDERFUL CHINESE ENCYCLOPÆDIA IN THOUSANDS OF VOLUMES

Very beautiful porcelain was made during the Ming dynasty, and another large encyclopædia was brought out, which occupied many editors and assistants for several years. It is said that this is the largest encyclopædia in the world. It runs to many thousands of volumes, and a copy of the first edition is now to be seen in the British Museum in the table cases in the King's Library. The Portuguese traders made but little impression on China, but the Jesuit missionaries managed to make their way inland in China to preach the Christian religion.

There are many splendid remains of the great Ming dynasty in China, especially near Peking. Among them is a long avenue of large stone animals in various postures, leading to the wonderful tombs of the emperors. There are also many magnificent memorial archways.

As the Ming dynasty was nearing its end, the Manchus, who were descendants of old Mongolian enemies of China, settled in Manchuria, about the River Amur, and made increasingly successful attacks on the empire till, in 1644, the Manchu line of rulers found themselves firmly seated on the throne, beyond the great wall that was built centuries before to keep out invaders. China is still ruled by emperors of the Manchu dynasty.

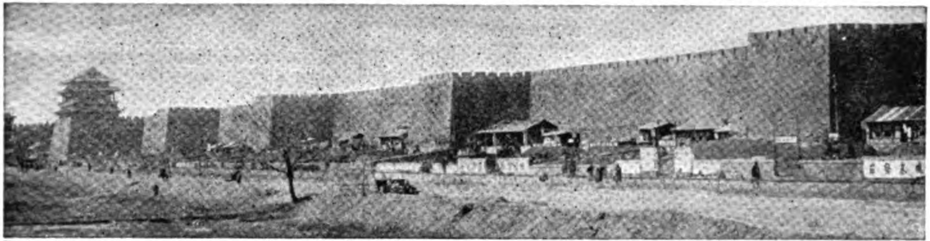
THE GREAT STRUGGLE OF THE NATIONS OF EUROPE TO SET FOOT IN CHINA

The last seventy years have seen a grim and never-ending game of the "King of the Castle" going on between China and the Western Powers that are so anxious to gain footholds in her rich and ancient empire. The chief object for which these footholds were desired was to force the Christian religion and Western ideas upon a country which detested them, and to open up trade with people who had so much to sell, and whose great numbers mean great buying power.

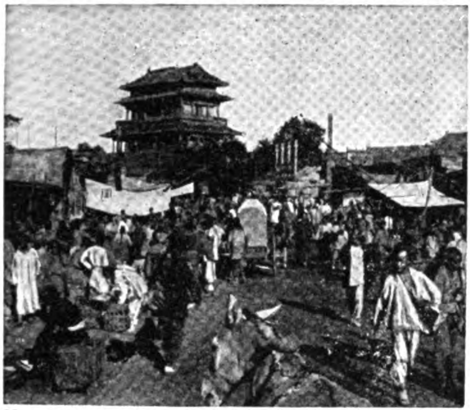
Little by little China has been forced to give way, and she has had to admit, one by one, her assailants into some part of the enchanted "Castle." Portuguese, Dutch, Germans, Russians, and British for years carried on the struggle, and after wars and sieges and stormings, and endless discussion of a more peaceful nature, the various foreign nations at last have gained the right of entry into the land so long closed to them.

It was in 1842 that, by the Treaty of Nanking, certain treaty ports were opened to foreign trading ships, and, as time went on, more and more concessions had to be given to the foreigners; concessions and money were often exacted as a punishment

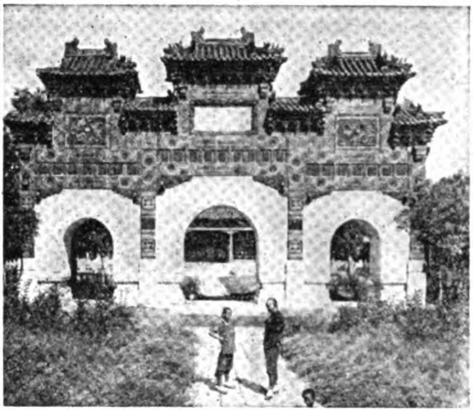
SOME FAMOUS CITIES OF CHINA



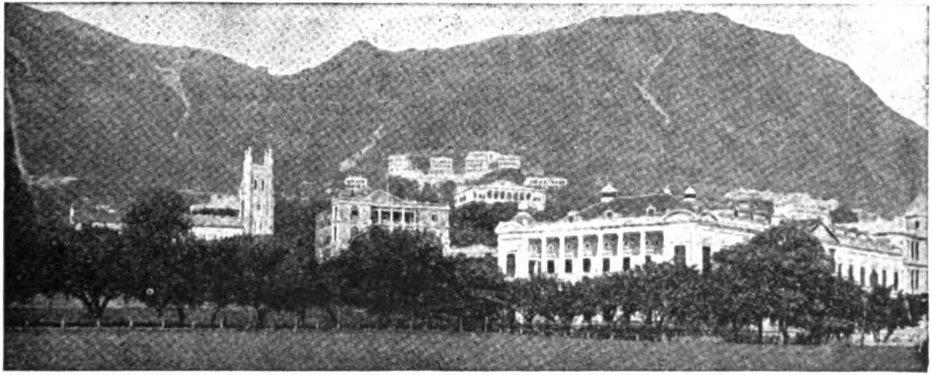
This picture shows one of the walls of the city of Peking. The city is really divided into two separate towns, one for the Manchus and the other for the Chinese, each being surrounded by its own wall, from thirty to fifty feet high.



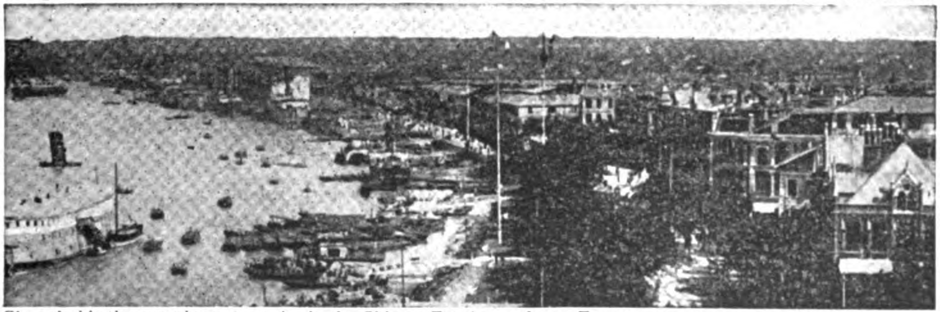
Here we see a busy market in the Manchu, or Tartar city of Peking, which is the principal part of the Chinese capital. This street is in some parts 200 feet wide.



In this picture we see the famous Hall of Classics in Peking, a building containing 182 pillared slabs of granite with the whole of the Chinese classical books engraved on them.



This is a view of Victoria, the capital of Hong Kong, the British possession at the mouth of the Canton River. It is a great British naval station and an important commercial centre. The mountain at the back is Victoria Peak.



Shanghai is the most important city in the Chinese Empire, so far as European trade is concerned. The native part of the city is indescribably filthy, but on the north the European city, shown here, is very handsome.

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for killing missionaries or other representatives and burning their property. Shortly after the settlement of Nanking, a terrible rebellion devastated a large part of China for fifteen years. In 1864 the British were able to help the Government to restore order. In the centre of Trafalgar Square stands a statue of that fine soldier and man of action General Gordon, often spoken of as "Chinese" Gordon, from the part he took in putting down this Taiping rebellion, as it was called.

THE FIRST TROUBLED YEARS OF CHINA'S AWAKENING

His campaign in the delta of the Yang-tse-kiang, among the streams and canals and lakes, all broad and navigable channels, was most carefully planned, and was full of exciting events. In one action an armed steamer, with a crew of forty men, got the better of a force of many thousand rebels. He drilled the Chinese forces, urged on men less brave and energetic than himself, and showed the Chinese not only how to make war, but how to end it.

These first years of China's awakening after the long, numbing sleep of centuries have, indeed, been full of trouble and pain. There have been almost incessant wars with the neighbours who could no longer be kept out, with Russia, France, Germany, Japan, and during these wars China has learnt by sad experience that her old ways of warfare, though picturesque in their setting, and almost sacred from long custom, were useless against those of her opponents. Now Chinese troops are drilled by Western methods.

THE BOXER RISING AND THE FLIGHT OF THE EMPEROR FROM PEKING

Naturally there has been much feeling against all the new ideas in this most conservative country in the world; the first railways were torn up as soon as laid; telegraphs were bitterly opposed, and Christian missionaries always carried their lives in their hands. So greatly have they been hated, in spite of the ability and devotion they have shown, especially in organising relief in times of dreadful famine and plague, that in 1900 a great rising—called the Boxer rising—took place, against the missionaries at first, but eventually all the hated foreigners were attacked. For two terrible months the European residents in China were in great danger. Many were killed, and others suffered all the terrors of a siege. They were shut up in Peking, with a howling mob eager for their lives outside, till relief came, and the Boxers were driven away. The allied forces made their way to Peking, and the emperor and his aunt fled far westward for safety, till peace was settled and justice done.

The efforts of Christian missionaries in China have been sadly hampered by the actions of traders of their own faith, by their want of principle, and by the bad example that many of them have set. Great wrong has been done in the past by Englishmen in furnishing, for the sake of money, arms and help to the rebels who were devastating China when Gordon came to the rescue, and by their insisting on sending into China the poisonous drug opium, against the wishes of the rulers; this also for the sake of gain.

The smoking of opium has quite as bad an effect on people as taking too much strong drink—it destroys them body and mind, and it has been a terrible curse to China. Strong efforts are now being made to persuade people to give up the habit that is so easy to form, and so very difficult to break.

THE SIGHTS OF THE CITY IN WHICH THE EMPEROR OF CHINA LIVES

Foreigners have now gained more than a mere foothold on the shores of China. It is comparatively easy for them to pass from end to end of the beautiful and wonderful kingdom. Many travellers have already done so, and they have shown us, by words and photographs, the marvels of this long-shut-up land. Let us, too, pass in.

There are three main ways of reaching China. We can go to Europe and then by the Siberian Railway, branching off through Manchuria, and crossing the Great Wall to Peking; or we can travel to the East by going westwards—that is, by train across our mighty continent to the Pacific, where steamers take us across to its other side; or by steamer across the Atlantic and then through the Suez Canal, to any chosen port.

All are most delightful and interesting journeys. Let us start at the "Court of the North." Peking contains at least a million inhabitants, and is near the Pei-ho River, at the mouth of which is its port, Tientsin. Peking is really made up of two cities—the outside Chinese city, where business is done, and the inside, or Manchu-Tartar town, where the foreign embassies are.

The emperor held his great court in an enclosure full of splendid buildings in the centre of the Tartar city. To this famous Forbidden City very few foreigners ever gain admission.

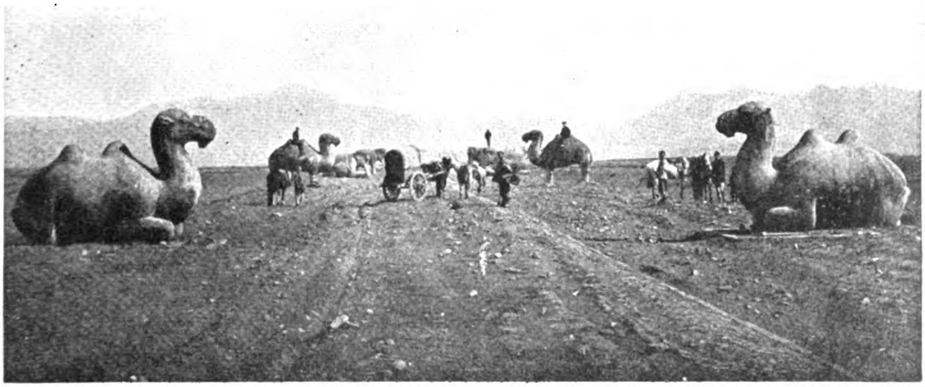
Grand, indeed, are the pageants to be seen when the emperor visited the Temple of Heaven to pray for a good harvest, leaving upon the mind a dazzling blur of golden yellow—the imperial colour of the Lord of the Yellow Land—of brilliant touches of blue, green, and crimson, as the trains of high officials in gorgeous array pass on in the procession. Long are the ceremonies, bowings, and prostrations, endless the prayers and readings from silken scrolls, as the incense floats towards heaven from bronze censers.

In China men seem to go on being examined all their lives, chiefly in order to obtain appointments. There are examination centres all over the country, but it is to Peking that thousands come every year to try to get into the highest college of all.

In Peking are the imperial factories where the beautiful silks and china are made for the emperor to give as presents, and many splendid buildings, temples, tombs, palaces, and fairy-like gardens, stand out in striking contrast with the dirt and poverty everywhere to be seen. The dust—yellow dust—is dreadful in Peking, and penetrates into palace and hovel alike.

There are railways now being rapidly developed in many directions, especially in the rich delta plain of China, connecting the chief ports, and running far inland. Steamers, too, ply on the network of rivers and canals, besides the old-fashioned boats with square sails, called junks, so familiar in Chinese pictures. Where the shifting bed of the Hwang-ho has to be crossed, the bridges are some of the longest in the world.

Shanghai is at the mouth of the Yang-tse River, and is one of the chief trade centres in the country. Here we find rows of European houses and shops, with their names hanging downwards, instead of across a signboard; and the public gardens are full of most glorious flowers. Crowds of people, European and Chinese, rich and poor, throng the streets, and factories with smoky chimneys remind us of the new ways that have begun to replace the old.


The tombs of the Ming emperors of China, near Peking are approached through five magnificent gateways, and up a road a mile long, by the side of which stand immense stone figures of men, and camels, and elephants, and griffins. The appearance of this lonely road, with its great silent figures on either side, is very strange indeed.

Nanking—the Court of the South—is also a very important place on the Yang-tse River, and higher up still is Hankau, a great place for the tea trade. The porters waiting about for work on the tea steamers make us think of our dock labourers at home.

From Hankau it is still some distance to the wonderful Yang-tse gorges, a thousand miles up the river from Shanghai. The high precipices, and towers of rocks and pinnacles, all of most fantastic or massive shapes, are relieved by the lovely trees and shrubs, and a profusion of flowers all growing wild: such as larkspur, jasmine, white lilies, sunflowers, and many others that we grow in gardens and hothouses in America. It is exciting work punting the boats on the rapids, and, before long, communication between the two ends of this difficult part of the river will be improved. The rich province of Szechuen—as large as France—is watered by the upper Yang-tse River, and is full of mountain and water beauty, as well as great, rich crops of all kinds.

THE GREAT CHINESE PORT OF HONG KONG THAT BELONGS TO BRITAIN

There are many wonderful Buddhist temples and monasteries all over the country, often on mountains that are most difficult to climb. Pilgrims visit the shrines of saints, as in Tibet and India; and prayer-wheels, and ringing of bells, and grand ceremonials, with reverence of the lamas, show how widespread is the ancient religion.

Hong Kong is an island half the size of Staten Island, N.Y., at the mouth of the Si-kiang, or West River, and it belongs to the British. It is now a most important place, both as a trading centre and as an Army and Navy station, though it was a bare rock little more than fifty years ago. Victoria, its capital, has a splendid harbour, and on its long quays, and in and out of its hive-like warehouses, thousands of Chinese work, dealing with the immense stacks of goods—silk and tea, cotton and woollen goods, coal, and many kinds of food—which all pass through this great port overlooked by hills.

Canton—the City of Perfection—is also on the West River, and for long it was the only port open to Europeans. Many Chinese live in boats on the river at Canton, and on other waterways.

THE CRUEL CUSTOM OF CRUSHING AND PRESSING THE FEET OF CHINESE GIRLS

The very poor have a hard time in China, and among them baby girls are seldom welcomed, though every Chinaman is thankful and glad to have sons to carry on the customs connected with the worship of ancestors that alone can help them, as they believe, to happiness in a future life. It is one of the sights of China to see a family party setting off to the cemeteries on their great festival days, to honour, with gifts and feasting and enjoyment, the relations who have become "guests on high."

Formerly, little girls had a sad time of it, though now matters are slowly improving for them. Married when very young to a husband she had perhaps never seen, the custom has long been that the little Chinese bride should go to live in her mother-in-law's house, and become a mere drudge. And this was not the worst of it.

Centuries ago, before people wore stockings, linen bandages were wound round the legs and feet, somewhat after the manner of puttees. When the fashion arose of admiring small feet in China, the bandages were drawn even tighter. At last the toes were crushed out of shape right under the foot, which was pressed into a tiny shoe much too small for the foot of a healthy baby of a year old.

We are filled with horror when we think of what the sad-eyed little Chinese girls go through to obtain little feet. Formerly, no high class girl could expect to be married unless she had small feet, and so, century after century, the cruel practice was carried on.

A WOMAN'S CUSTOM THAT IS CHANGING AND A MAN'S CUSTOM THAT HOLDS FAST

Happily, the custom is now dying out. Now there are anti-binding leagues, and many Chinese have insisted on their daughters' feet being left free to develop with the rest of their bodies.

It is not so with that other striking feature of China, however, the pigtail. Originally, the custom of wearing a pigtail was a badge of conquest by the Mongols, who insisted on Chinamen wearing their hair closely shaved in front with a long plait behind, so that they could be distinguished at a glance. But the Chinese have long looked upon it as a mark of honourable distinction, and grieve bitterly when anything happens to deprive them of what has been a life-long growth and care.

To the wonders of China there are no end. The nation is awakening, and who can say what may be the future of a country with such a great seaboard on the important Pacific, and with enormous coal and iron beds scattered in its various provinces, and millions upon millions of thrifty workers?

The next story of Countries is on page 191.

WHAT THIS STORY TELLS US

EVERYONE should love his own country; and everyone who loves his country wants it to be free. But we do not always mean just the same thing by Freedom or Liberty. Sometimes, when we say that people have been champions of liberty, we mean that they have fought against oppression of every kind—oppression by tyrant kings or tyrant soldiers, oppression of the weak by the strong. But sometimes we mean that champions of liberty have been ready to suffer and to die in fighting the one kind of oppression which is most hateful of all—oppression by foreign rulers or conquerors. It is about champions of liberty of this particular kind that we read here; men who sacrificed themselves to free their land from a foreign yoke. There were some who succeeded and some who failed, some who died fighting and some who were foully done to death; but the names of all alike are held in honour as national heroes.

HEROES OF THE NATIONS

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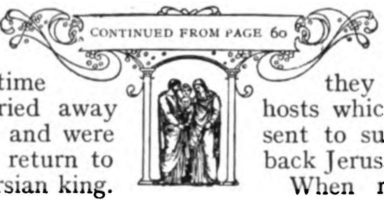


THE Bible tells us about the history of the Jewish people down to the time when they were carried away captive to Babylon, and were afterwards allowed to return to Jerusalem by the Persian king. But it does not tell us their history between that time and the time when Jesus was born.

Now, during that period there arose a mighty kingdom of Syria, the rulers of which were descended from a Greek general who had been in the army of Alexander the Great; and these kings ruled over Palestine too. But at last one of them, named Antiochus, resolved to make the Jews give up worshipping God according to the Hebrew law, and to offer sacrifice to false gods. Then there arose one, Mattathias, who, with his sons, refused to obey the orders of King Antiochus; and when they saw Jews ready to sacrifice to false gods, they slew those Jews and called upon all the people to fight for freedom, so that they might worship the God of their fathers. Among the sons of Mattathias, the most skilful warrior was the second, whose name was Judas, surnamed Maccabæus, which means the Hammer. Therefore men call his family the Maccabees, because they made Maccabæus their general.

Judas gathered together a troop of Jews who were ready to die for faith and freedom; and though they were few in number, yet they routed utterly great hosts which the King of Syria sent to subdue them, and won back Jerusalem from his soldiers. When men saw this small band making havoc of vast armies, they gathered to Maccabæus, nor could the Syrian generals in any way subdue them. And though Judas himself was at last slain in a battle, where his followers were so few that they were overwhelmed by the numbers of the enemy, yet it was indeed he who at that time won freedom for the Jewish people.

We will leave these very ancient times and turn to English history. Here England is fortunate; for no foreign conqueror has set foot on her soil since Duke William of Normandy, so that we must go back to his days to find an English patriot of the particular kind we are talking about. Duke William overthrew King Harold at the battle of Hastings, and made himself King of England; but when he thought that he had made himself lord of all the land, there appeared a valiant champion called Hereward the Wake.

Now, whether Hereward was a cousin of some great English earls we do not know for certain; but he himself was a landless man, and could not gather a great army.

Yet he and his band made themselves a camp on the Isle of Ely in the Fen Country, and they fell upon the Normans so fiercely that the Conqueror himself, the greatest general of the time, had to come with a great army against them before they could be driven from the "Camp of Refuge." But after that Hereward and his men could make no headway against the Normans, until at last they saw that it would be vain to struggle more; and Hereward made his peace with William. After all, however, good came of that in the end, because Normans and English grew into being one people, greater than ever the English would have become by themselves.

HOW THE ENGLISH KINGS TRIED TO BE MASTERS OF SCOTLAND AND WALES

The English never had to fight for their own freedom; but sometimes they have conquered other nations, and sometimes those other nations have won their freedom back. The English people themselves won the land of England from the Britons; but the Britons held possession of the mountainous land of Wales, and the Kings of Scotland were not conquered by the Kings of England.

Still, the English kings wanted to make all the people of the island into one nation, and at last King Edward I. very nearly succeeded in doing so. He did indeed conquer Wales; but he found that a very difficult task, for the hero of Welsh liberty, the Prince Llewellyn, fought against him valiantly, and persuaded all the Welsh to join together and fight against Edward. Nevertheless, Edward overcame him, and he was slain, and Wales became a part of the kingdom of England, although more than a hundred years later there arose another champion of the Welsh, Owen Glendower, in whose lifetime the King of England could not make his will prevail in Wales.

WILLIAM WALLACE, THE YOUNG MAN WHO LED THE SCOTS AGAINST THE ENGLISH

King Edward I. strove hard in like manner to bring Scotland under his sway. For when the young Queen of Scots died, who was called the Maid of Norway because she was born and bred in that land, the Scots were divided as to who should be king after her; and they asked King Edward to judge between the men who claimed the throne. And of these men John Balliol said that he would own Edward for his overlord, and the King gave judgment in favour of Balliol. But afterward he said that John Balliol, having sworn to be loyal to him, had broken his promise, and he drove Balliol from the throne, and sought to rule Scotland with English officers.

It would seem that the barons of Scotland did not greatly care whether Edward was king over them or another; but the common folk would not endure to be ruled by English masters; for the English soldiers treated them as though they were a conquered people.

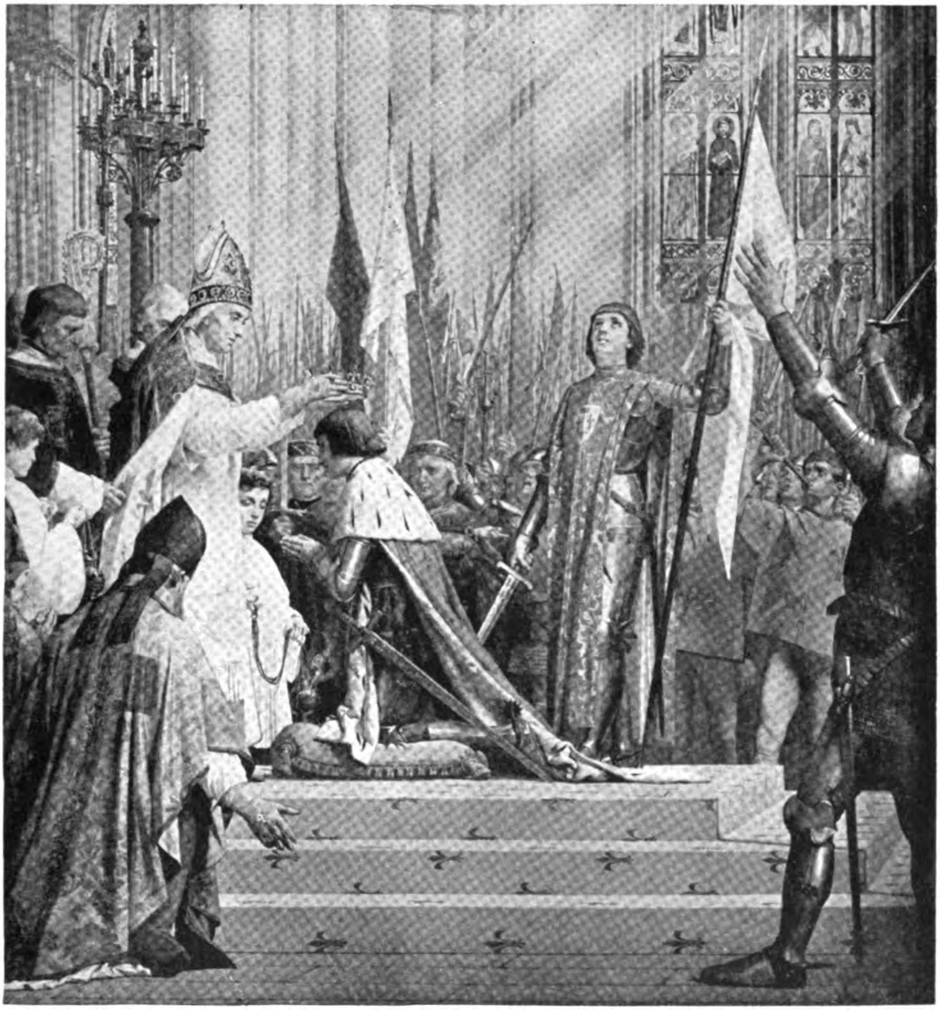
Then there appeared a young man named William Wallace, who was very strong and skilful with all manner of weapons; who, when some English soldiers tried to rob him, turned on them and slew them with his staff, though they were armed. The English set a price upon his head, and he fled to the hills, and there gathered round him many valiant men who were determined to rid their native land of foreign masters. Then the English governor gathered an army, and Wallace awaited him by the bridge near Stirling.

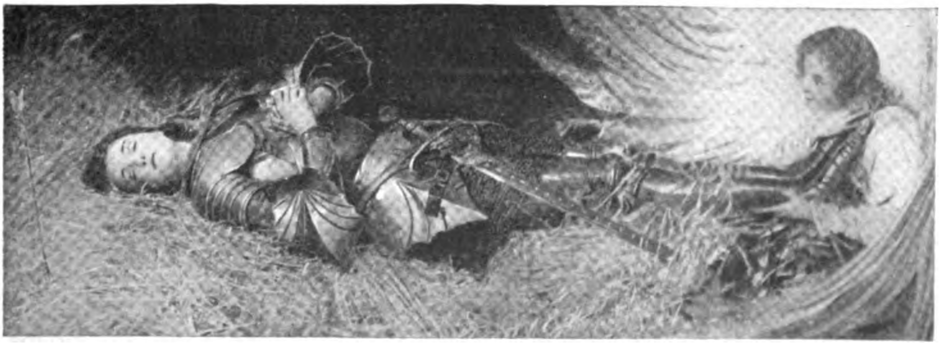
HOW THE PEASANTS RALLIED ROUND WALLACE AND DROVE THE ENGLISH OUT

So the English army began to march across the bridge, which was very narrow, thinking to set themselves in battle array and then crush the Scots, of whom most were but peasants. But while a part of the army was on one side of the river and a part on the other, Wallace set upon them suddenly, putting them utterly to rout; and the fame of his exploit stirred up many more of the Scots to join Wallace, and the English were driven out.

But thereafter Edward, who had been abroad, went back to England, and marched into Scotland with a strong army, having many mail-clad horsemen and archers; and the Scots lords still held aloof from Wallace, not willing to be led by a captain who was not of noble birth. Nevertheless, Wallace gave battle to King Edward at Falkirk, having his men all on foot and armed with long spears; and he and his men fought so stoutly that the horsemen could in no wise break through their line, till Edward bade his archers send a storm of arrows among

JOAN AT THE CROWNING OF THE KING





These two pictures bring home to us the great wonder of the story of Joan of Arc. A simple peasant maid, she put on her armour to deliver her country in great battles, and in the bottom picture we may fancy her at rest after a great fight. The large picture shows her in the supreme moment of her life, when she took her place by the throne of the King of France, who was able, because of her victories, to be crowned in peace.

them. Then, great gaps being made in the ranks of the Scots, the English charged through, and routed them.

But, even after this, Wallace, having escaped, went on fighting against the English; till one day a false knight betrayed him into the hands of English soldiers, and he was taken a prisoner to England.

HOW WALLACE DIED IN SCOTLAND, AND JOAN OF ARC CAME IN FRANCE

King Edward, instead of treating Wallace as an honourable and valiant foe, declared that he was a base rebel, and put him to a shameful death. Yet the Scottish people were no more willing than before to yield to the English, and how they found a leader in Robert Bruce, who drove the English out and made Scotland a free land once more, is told in the story of the Kings of Scotland in the CHILD'S BOOK OF MEN AND WOMEN

It was more than a hundred years after this that the greatest of England's soldier-kings, Henry V., conquered half of France, dying before he could accomplish more; and after his death his brother, the Duke of Bedford, strove to complete what Henry had begun. The staying of the English conquest is one of the most wonderful stories in history, seeing that it was not the work of a warrior practised in arms, but of a simple peasant maiden, who is called Joan of Arc. To her, while but a young girl dwelling in her native village, there came voices and visions, bidding her to arise and save France.

THE BRAVE AND STAINLESS MAID WHO LED THE FRENCH TO VICTORY

After a time she became so very sure that this was, indeed, no silly fancy, but the very bidding of God, that she began to persuade those about her to believe it. She went to the place where the King of France was, and though men mocked at her first, yet soon they were convinced by her purity and her earnestness that she had, indeed, been raised up by God to deliver the land; and the King sent her, clad in white armour, at the head of a troop of horsemen, to the town of Orleans, which the English were besieging. She drove them from the walls. The rude soldiery, with that selfless and stainless maid for their captain, learned to feel shame for all foul speech and foul thought, and followed her as a leader sent from heaven. Wherever she went, it seemed that the enemy must be scattered before her, till the English deemed that she must be a witch, though others held her to be a saint. By her victories she gave the French new heart and hope.

Yet at last she was taken prisoner through treachery, because, being pursued by the enemy after a battle, some Frenchmen shut the gates of the fortress into which she should have escaped. Joan was thereupon brought to trial, as being a witch and a heretic, and was condemned by her judges, who were French, but was given over to the English to be punished. And we have to write with sorrow to-day that they burned her alive in the market-place at Rouen, in Normandy. But this is certain, that from that day the English seemed to feel that the hand of God was against them, and they were no more successful in that war, but were presently driven out of all the land that Henry V. had won. As for Joan of Arc, who is called also the Maid of Orleans, she, though she died a death so cruel, lives for all time as a great example of stainless heroism.

HOW WILLIAM TELL SHOT AT THE APPLE ON HIS LITTLE BOY'S HEAD

There are no people who love liberty more dearly than those who dwell among the mountains or by the sea. There are two small nations in Europe which were once under the yoke of a foreign oppressor, and each of which found heroic leaders to win their freedom. One is a nation of mountaineers, and the other a sea-going folk.

The first of them is Switzerland, which once was subject to the Austrian archduke, who was sometimes emperor as well. Switzerland is divided into districts which are called Cantons; and an officer appointed by the archduke used to rule them, and to rule very harshly.

Tradition relates that there was a skilful archer named William Tell, who would not obey an order that all men were to take off their hats to the archduke's hat, which was a kind of crown. So he was taken, with his little son, and an apple was set on his son's head, and Tell was bidden to shoot at the apple; and he did so, piercing it through. But

THE CRUEL DEATH OF A STAINLESS MAID

The Maid of Orleans led the French army to so many triumphs that the English declared she must be a witc though others held her to be a saint. After a battle, some Frenchmen shut the gates of a fortress into which Joa of Arc should have escaped, and by this act of treachery the Maid was taken prisoner. She was brought trial and condemned, and it is with sorrow we have to write that the English burned her alive in the marke place at Rouen. Though she died by a death so cruel, she lives for all time as a great example of stainless herois afterwards he caught the archduke's officer in an ambush, and slew him, as we read in the full story of William Tell that appears in our story pages.

HOW ARNOLD VON WINKELRIED GAVE UP HIS LIFE FOR HIS COUNTRY

After that the Swiss banded together, and would not obey the Austrians any more. But Switzerland really won its freedom at the battle of Sempach, where another great hero of the Swiss people gave his life for his country. A great host of Austrians came against the Swiss; and they were clad in stout armour with long spears and swords; but the Swiss were not protected by heavy mail. When the Swiss rushed upon them, they could not break through, but were thrust down and cut to pieces.

Then Arnold von Winkelried bade the Swiss draw together in the shape of a wedge or triangle, and follow him; and he ran upon the Austrians, stretching out his arms and dragging the spears together, so that all the points, as far as he could reach, were drawn together and pierced his own body, so that he fell and died. But in this way he made a space where there were no spear-points, and there the wedge of Swiss drove in, and so fought hand to hand with the Austrians and put them utterly to rout. After that the Austrians saw that it would be no use to try to force their rule upon the Swiss.

Another race of mountaineers found a heroic leader who won them freedom for a time. The Turks, who were followers of the religion of Mahomet, began to make conquest of lands in Europe just a little more than five hundred years ago.

HOW GEORGE CASTRIOT HELD THE TURKS AT BAY FOR TWENTY-FIVE YEARS

On the western side of what afterwards became the Turkish Empire, there is a mountainous land called Albania. Here the conquering Turks made their way, and forced the lords of the land to submit to them; and they carried away the young son of one great lord, and brought him up in the faith of Mahomet.

The young man, who was called George Castriot, fought in the Turkish armies, and became skilled in war. Yet he had no wish to serve the Turks, though he bided his own time, and when he was nearly forty years old he, with a band of Albanian followers, suddenly left the Turkish army and seized a fortress called Croya. Having done this, he declared himself a Christian, and called upon the Albanians to rise and wage war upon the Turks.

The Albanians drove out the Turks, and took him for their leader, and because he showed himself so great a soldier men called him Scanderbeg, which means the Lord Alexander. For though the Turks sent mighty armies against him, and were very great warriors, yet he overthrew them in battle many times, though they might have four or five times as many men as he. For twenty-five years he held the Turks at bay, so that they feared his name greatly; but after he died, the Albanians, lacking a leader, and getting no aid from other nations, were overcome by the Turks, and lost the freedom which Scanderbeg had won for them.

Yet another mountain race strove stoutly for freedom in the days when the great Emperor of the French made the monarchs and nations of Europe do his bidding.

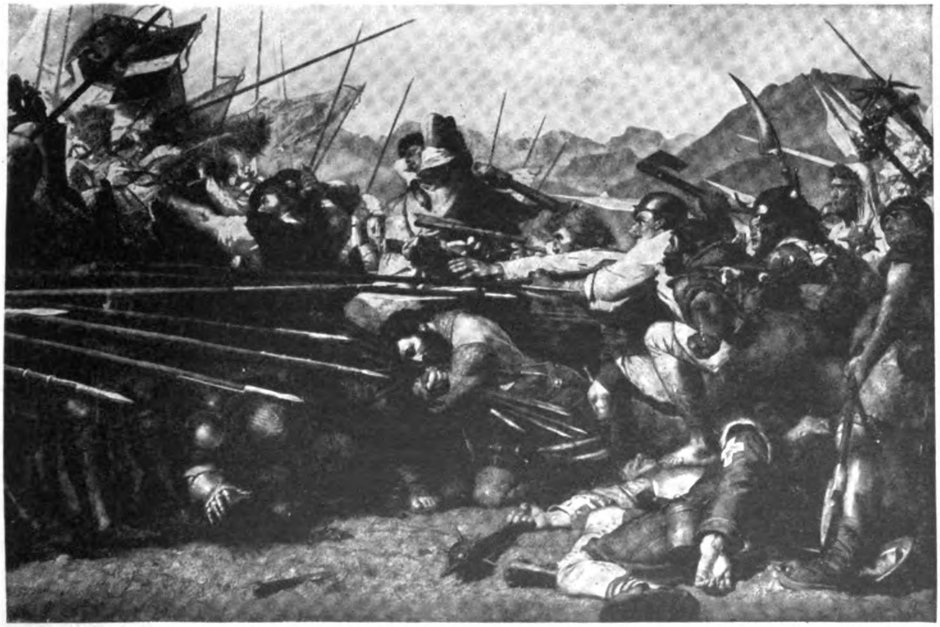
ANDREAS HOFER, THE BRAVE INNKEEPER WHO FOUGHT NAPOLEON

Among the dominions of the Austrian emperor is a land called the Tyrol, which borders upon Switzerland, and Napoleon caused the Austrian emperor to give the Tyrol to the King of Bavaria, who was always ready to do his bidding. But when the Austrians went to war again with Napoleon, the Tyrolese rose up under Andreas Hofer, who was an innkeeper, and drove the French and the Bavarians out of the Tyrol, though they themselves were only peasants. For a short time Hofer was made their ruler, as a loyal subject of the Austrian emperor, though he would not obey the Bavarian king and the Emperor of the French.

But the French armies defeated the Austrian armies, and the Tyrolese could not openly resist the power of Napoleon unaided. And then, though the brave Hofer hid among the mountains, a traitor was found who showed the French where he was. He, being taken prisoner, was tried like William Wallace and Joan of Arc, and was condemned and shot as a rebel. Yet the stand that Hofer made helped to give heart to the

TWO MEN WHO DIED FOR THEIR COUNTRY

When Edward I. was trying to conquer Scotland there appeared a young man named William Wallace, who, when some English soldiers tried to rob him, turned on them and slew them. The English set a price on his head, and Wallace fled to the hills, gathered an army round him, and scattered the English soldiers at Stirling. Although the great lords of Scotland held aloof from him, as he was but a plain man, yet Wallace went on conquering, until one day a false knight betrayed him and King Edward put him to a shameful death.



When the Swiss were fighting against the Austrians, who would have taken away their freedom, there arose among the Swiss a great hero named Arnold von Winkelried. The Austrians were ranged like a wall, in stout armour and with long spears, so that the poor Swiss could not break through them; but Winkelried bade the Swiss draw together in the shape of a triangle and follow him. He ran upon the Austrians, stretching out his arms wide, and dragging the spears together so that all the points he could reach pierced his body. He died, but he had made a way through the Austrian ranks, and there the Swiss drove in and fought until the enemy was put to rout.

other nations of Europe to rise against the rule of Napoleon, and so in due time Napoleon was overthrown, and the Tyrol was restored to its old freedom, for which Hofer had fought and died.

The sea-going people which won its liberty was the little state of Holland, where there are no mountains at all. In the days when good Queen Bess ruled in England, Holland and Belgium were ruled by King Philip of Spain, who tried to take away their freedom and to force them to give up the Protestant religion. He sent a merciless governor, the Duke of Alva, to Holland with great armies, and the Protestants suffered great persecution. The Prince of Orange, called William the Silent, one of the nobles of Holland, formed a league to drive out the Spaniards; and though the Roman Catholic part of Holland would not join him, he led the Protestants so that they utterly refused obedience to Philip.

HOW WILLIAM THE SILENT WAS PUT TO DEATH BY A SPANISH PLOT

Yet, if the Dutchmen had been a little less sturdy, and William a little less resolute, they must have been crushed. They got some help from Queen Elizabeth, and a little from the French; but they owed far more to the skill and persistence of William than to anything else. Therefore Philip encouraged men, some of whom were merely scoundrels, though others were honest bigots who thought it right to kill by any means the man who fought so stoutly against the power of the Church of Rome, to murder William, and William, too, died for his country's freedom. After this the courage of the Dutchmen did not fail, but they went on fighting, and at last the power of Spain was broken, for there came open war between Spain and England, and England won, so that the Spaniards gave up trying to subdue the Dutch, and Holland became free.

Two other of our heroes lived not very long ago, for your fathers and mothers were born before either of them died. You know that Italy today is one of the great nations of Europe, and one of the men who helped most to make her so was Garibaldi. When he was born, Italy was made up of several states, some of which were subject to Austria, while the northern part was ruled by the King of Naples, who was not an Italian.

Now, there were many people in Italy who wished to be free from foreign rulers, and there were some who dreamed that all Italy might become a free and united nation.

GARIBALDI, THE FISHERMAN'S SON WHO MADE ITALY A NATION

So while Garibaldi was still a very young man, though he was already a skilful sailor, being a fisherman's son, he joined in a revolt against the rule of the Austrians. This was easily crushed, however, so that he had to flee to South America. There he took part in the wars which were going on, because the land was very unsettled, and he became famous as a leader, whose men were always ready to follow him to the death.

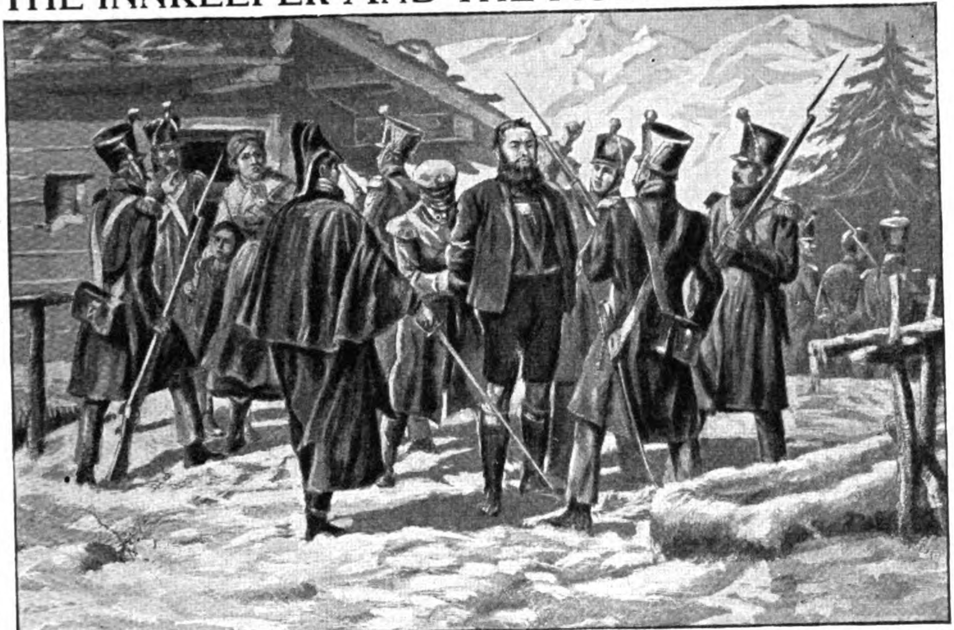
But after a time he returned to Italy, and joined in a fresh revolt, gathering men who were ready to fight, because Garibaldi filled them with his own great love of their cause. Yet they were still not strong enough to overthrow the Austrian rule, and again he had to go away to the United States. Yet again he returned, and once more the men of North Italy arose. This time they were victorious, and before long all Italy became one nation. And this was certainly in great part because of the power that Garibaldi had of filling those about him with his own courage and enthusiasm, even when their cause seemed hopeless.

LOUIS KOSSUTH, WHO FOUGHT FOR THE FREEDOM OF HUNGARY

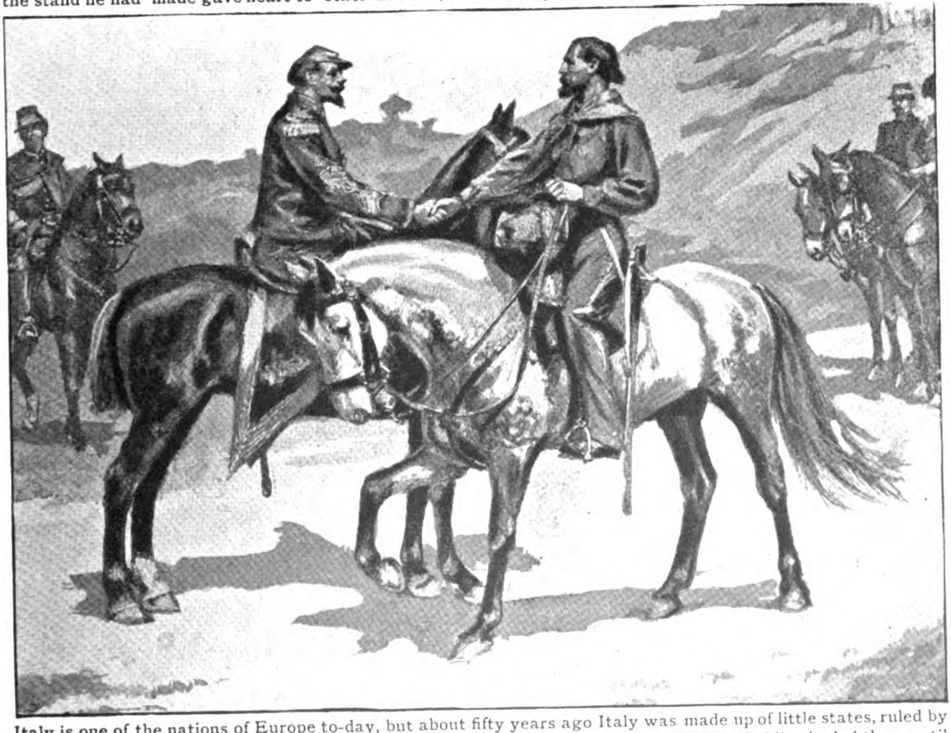
Last of all comes Louis Kossuth, who set himself to win freedom for Hungary from the rule of Austria, at the time when the Italians were seeking their own liberty. He was not a soldier, but a writer and orator, and a statesman; but the Hungarians made him their leader. They were defeated at the time, and Kossuth had to flee from the country; but later the Hungarians agreed to own the Emperor of Austria as their king if they could have certain rights of governing themselves; and this they owed, in the first place, to Kossuth. But Kossuth himself was not content with this. He would not own allegiance to Austria, and he died some years later, not in Hungary, but in Italy.

The next stories of men and women begin on page 211.

THE INNKEEPER AND THE FISHERMAN'S SON

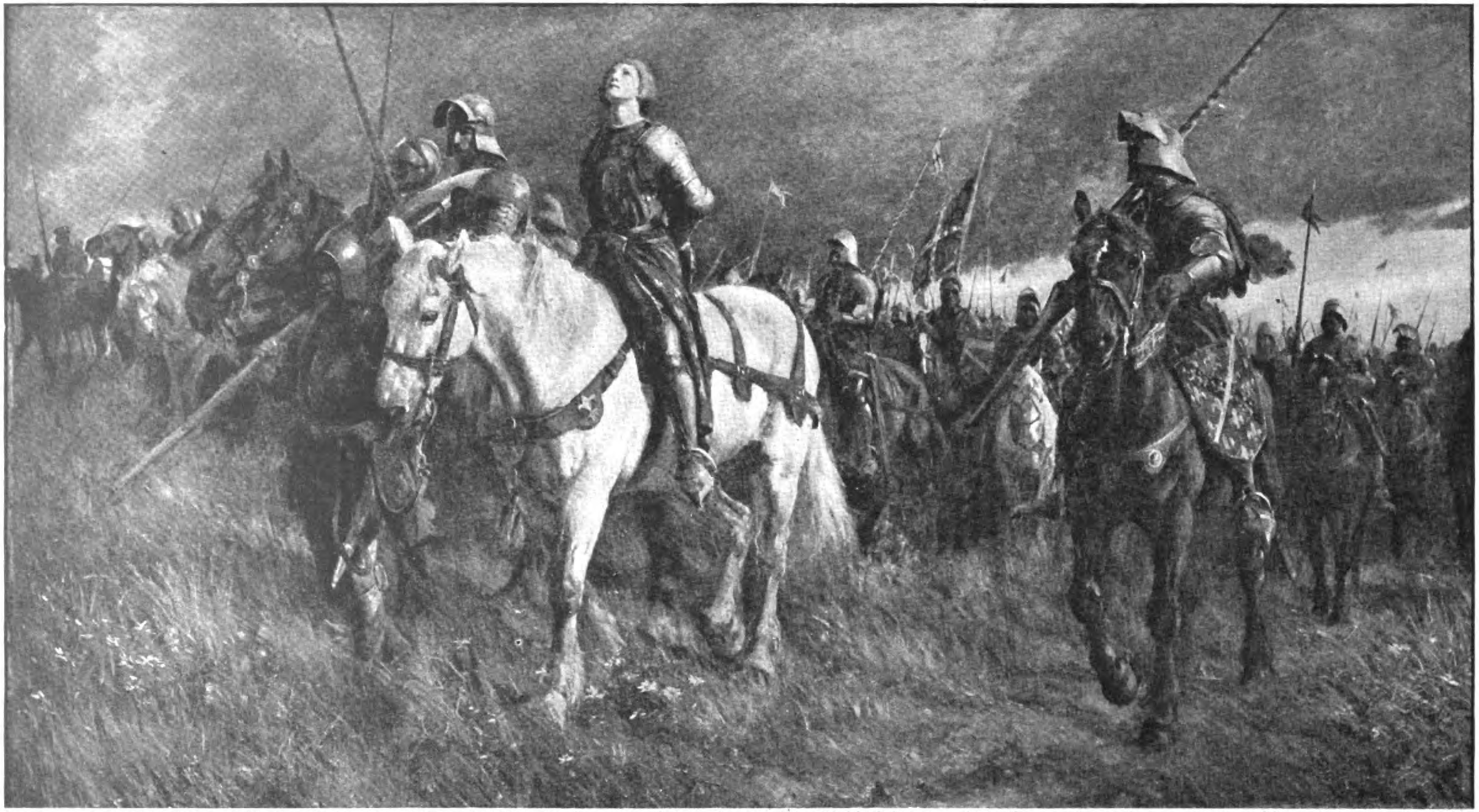


Napoleon caused the Austrian emperor to give one of his mountain lands, called the Tyrol, to the King of Bavaria. But the people rose against this, and Andreas Hofer, who kept an inn, led the Tyrolese peasants against the French and the Bavarians. But the peasants could not drive back the army of Napoleon, and Hofer hid among the mountains, where a traitor was found who gave him up to the French. He was shot dead. But the stand he had made gave heart to other nations, so that they rose against Napoleon and overthrew him.

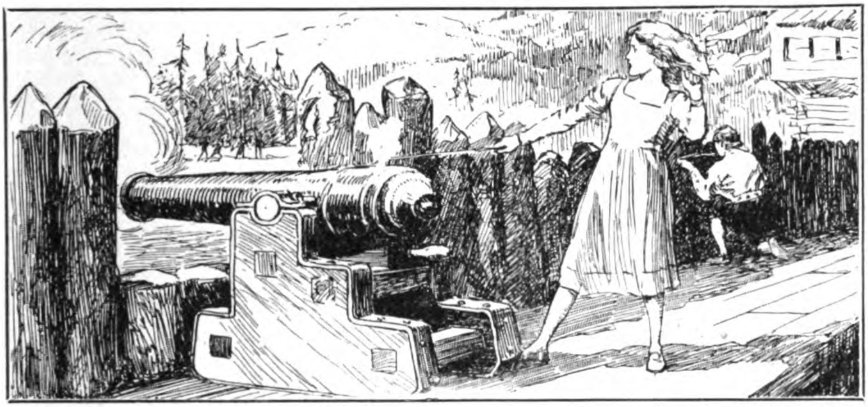


Italy is one of the nations of Europe to-day, but about fifty years ago Italy was made up of little states, ruled by **Austria.** The people revolted, and among them rose a fisherman's son named Joseph Garibaldi, who led them until **all Italy** became a nation, under King Victor Emmanuel, who is here greeting Garibaldi. Garibaldi is on the right.

THE PEASANT MAID OF ORLEANS TAKEN CAPTIVE BY THE ENGLISH



This picture should bring a thrill of pride to every boy and girl who looks at it. It is a picture of the Maid of Orleans, the selfless and stainless peasant maiden whose name is held in honour throughout the world. There came to her, as a young girl dwelling in her native village in France, voices and visions bidding her arise and save her country. And though men mocked at her at first, yet she went forth to deliver the land, and the King sent her, clad in white armour, at the head of a troop of horsemen to drive the English from Orleans. The English were scattered, and the victories of Joan of Arc gave new heart to France. But Joan was betrayed, and in this picture, painted by Rowland Wheelwright, she is being led captive.



THE GIRL WHO HELD THE FORT

CONTINUED FROM 66

The history of the early French settlers in Canada provides us with many a story of courage and devotion. Foremost among those whose names have become famous for heroic deeds in these perilous times was Madeleine de Verchères, who, as a girl of fourteen, saved a fort.

The fort consisted of several houses surrounded by palisades, and a strong blockhouse. One day Madeleine was standing by the riverside, some distance from the fort, when she heard the cry: "Run, mademoiselle, run. The Iroquois!" She turned and saw a band of Iroquois Indians. Swiftly she ran to the fort, and gained it just in time. Nearly all the people of the place were away in the fields when the attack was made, and were killed. There were left in the fort two soldiers, an old man of eighty, some women and children, and Madeleine's two brothers, boys of ten and twelve.

At the first sign of the danger the soldiers fled to hiding. As the Indians delayed their attack, Madeleine went round to inspect the defences. In the blockhouse she found the two soldiers preparing to set light to the gunpowder and blow up the fort. Madeleine's courage shamed them, and they set themselves to defend the place. They and Madeleine's two brothers opened fire from the loopholes, while Madeleine fired a cannon as a signal of distress, as shown in the picture on this page. This signal was repeated from post to post till the sign of danger reached the city of Montreal.

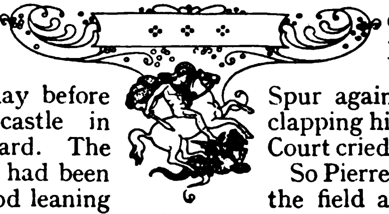
Night came on, and had the Indians attacked them in the darkness all would have been lost. Madeleine ordered her elder brother and the soldiers to guard the women and children in the blockhouse, while she posted her young brother, the old man, and herself as sentinels. Throughout the dread night they passed the cry "All's well," and the Indians, finding the place so well guarded, refrained from attack.

For a week the Indians besieged the fort, but, not knowing how weak the defenders were, dared not attack it. At the end of the week, during which Madeleine had scarcely slept or rested, she was dozing with her gun under her arm, when she heard the sentry cry that either Frenchmen or Indians were moving up the river. Help had come from Montreal! The brave little leader marched to the river, and saluted the officer commanding the party. "Monsieur," she said, "I surrender my arms to you."

The relief was accomplished. The Indians had fled. Madeleine could now rest secure. The news of her bravery spread far and wide, and her heroism was rewarded by a pension.

The town of Brescia, where Bayard died in defending a castle against the Spaniards.

THE MAN WHO KNEW NO FEAR



TOWARDS the end of the fifteenth century there was a pretty sight to be seen one day before an old and noble castle in France, the Castle Bayard. The old Lord Bayard, who had been wounded in battle, stood leaning on his two sticks, with his beautiful wife at his side. He was surrounded by a great court of attendants. The eyes of the old warrior shone with affection and admiration. All the attendants were clapping their hands.

And the cause of their delight was a boy, fourteen years of age, who, dressed in silk and velvet, and with a feather in his cap, was making his little horse perform.

The wounded and crippled lord could not train his son for knighthood; so the little horse had been bought, the gorgeous dress had been made, and Pierre was going forth to learn the business of a soldier at the Court of the Duke of Savoy.

In this service the boy distinguished himself by his courage and skill, and gained the affection of everybody by his simple and generous disposition.

One day the Duke wanted to send a magnificent gift to the King of France, and it occurred to him that he should send this brave page.

So it came about that the French King was one day in the midst of his Court when Pierre, on his little horse, made his appearance, sitting so beautifully and making his horse obey so easily that it was a pleasure to watch.

"Piquey! Piquey! Spur again!" cried the King, clapping his hands. And all the Court cried, "Piquey! Piquey!"

So Pierre went cantering round the field again, and everybody shouted their praise of the boy's horsemanship.

We must hurry over all the brave things done by this fearless boy, for they would fill many volumes; and look upon another scene, when Pierre is a man. He is tall, straight, bright-eyed, and gracious. He has overthrown the bravest knights; he has won the highest honours on the most desperate battlefields; his name has become a wonder to all mankind. He is called "the knight without fear and without shame." Everybody has heard of him; everybody knows how dauntless is his courage, how generous he is to fallen foes, how chivalrous to women, how brave a knight, how noble a Christian.

And now this is the scene. A great battle has been fought, and the new King of France, a mere boy, is riding out of his first fight, flushed with the pride of victory. One thing he desires: to be knighted. This great King longs to be created a brave knight. But who can do it? Is not he himself the Power who creates knights?

Well, that evening, before the King's tent, a wondrous sight was seen. The bravest soldiers of France made a great square before the tent, flags were flying, and the heralds blew their trumpets. Those who were to receive honour at the King's hands gathered in front, full of excitement. Everybody was waiting with pleasure for the ceremony. Then from his tent came the King. He walked to where Bayard stood, knelt on the grass before him, and Bayard, laying a sword upon the King's shoulder, created Francis I. a knight. The King had chosen the bravest and most courteous knight to raise him to the honour of knighthood.

One of the great exploits of this splendid Bayard was to defend a castle at Brescia against an overwhelming body of troops. When the Queen of those troops asked her general angrily how it was he could not take, with all his men and guns, "a crazy pigeon-house," the general answered, "Because, madam, there was an eagle in it."

That was Bayard's character in war; an eagle. He feared to meet no foe. He rode like a whirlwind to succour the weak. He crushed the power of tyrants. But in peace he was gentle. In war, an eagle; in peace, a dove.

Bayard's death was in a noble fashion. The French Army, fighting the Spaniards, had to retreat from a difficult position. While they moved away, Bayard, with a handful of men, stayed behind to keep the foe in check. And during this retreat he was struck by a stone from a crossbow, which snapped his spine in two places. He was lifted from his horse, and laid beneath a tree.

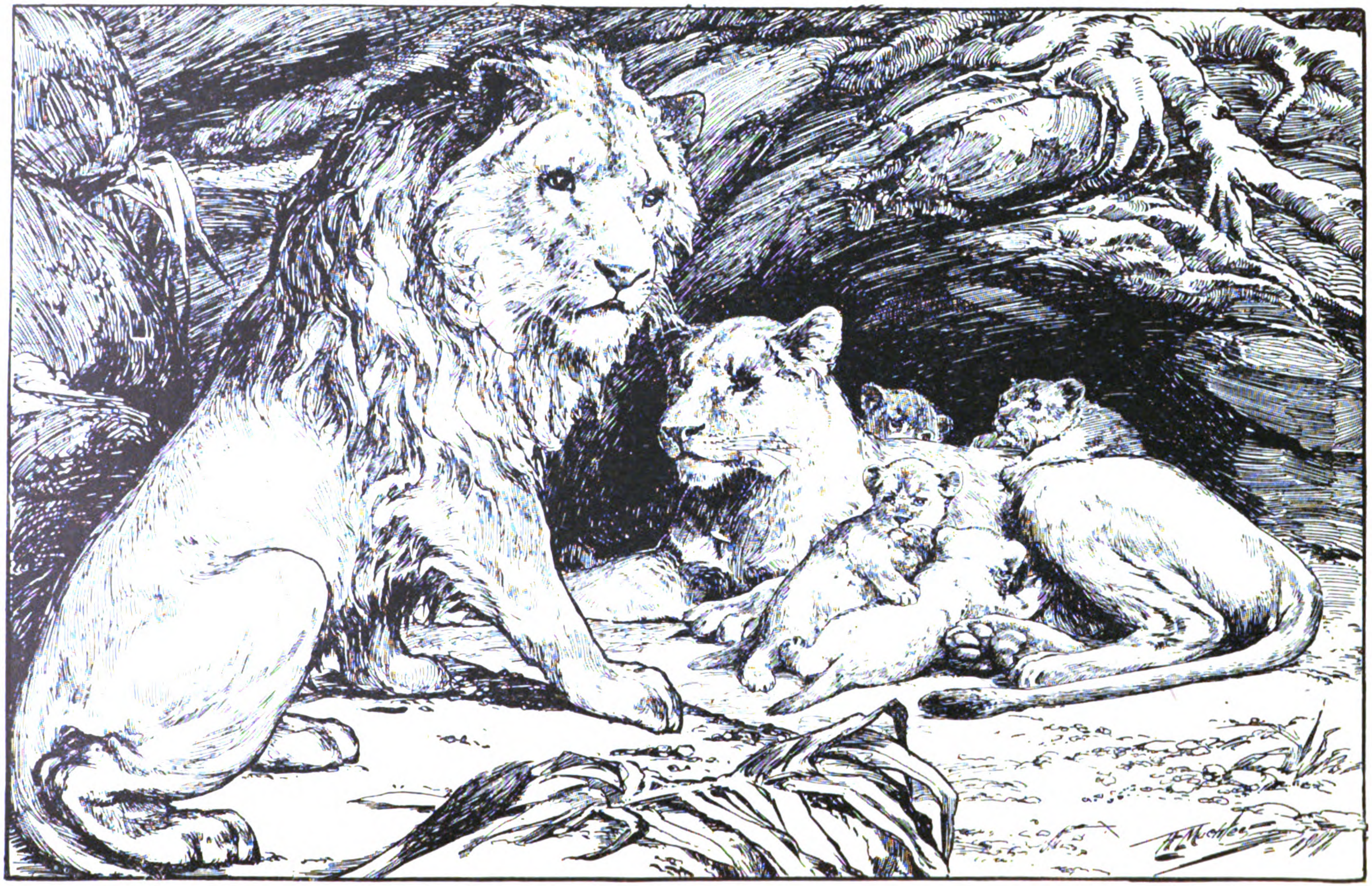
THE DEATH OF BAYARD, AFTER HOLDING THE SPANISH IN CHECK WITH A HANDFUL OF MEN

The dying Bayard raised his sword and breathed a prayer. Then he bade his friends ride into safety, and begged them to turn his face to the foe.

So died one of the bravest men that ever held a sword.

The next Golden Deeds are on page 244.

THE KING OF THE ANIMAL WORLD: A LION AND LIONESS WITH THEIR YOUNG



THE ANIMALS WE READ ABOUT

THIS story tells us of the life of the wild animals, and what happens in those parts of the world where the lion and the tiger still roam about and animals are the enemies of man. There are no dangerous wild animals left in England now, but there are still parts of the world where the lion is king and where its roar is terrible in the forest. Slowly, however, man has conquered the animal kingdom, and the great fight between animals and men ends always, and must end always, with the triumph of man. But we learn here that these animals are not useless in the world, for nothing ever created is quite useless, and the world could not spare even its wild animals.

ANIMALS THAT WORK FOR NATURE

LION
TIGER
LEOPARD
JAGUAR
PUMA
CHEETAH
LYNX
POLECAT
WEASEL
FERRET
CIVET
PINE MARTEN
SABLE
MONGOOSE
BEARS
WOLF
FOX
BADGER
WILD DOG
JACKAL
HYENA

CONTINUED FROM PAGE 51

THE best idea ot peace in the world is that which we fancy we see when reading of the days to come, when the lion shall lie down with the lamb, and a child shall lead them. We know that, if a lamb lay down near a lion to-day, the lion would quickly eat it. The lion seems, therefore, a cruel creature. But the lion is doing only what it was intended by Nature to do. Suppose there had been no lions, or tigers, or leopards, or other flesh-eating beasts in wild countries. There would have been all kinds of deer and cattle, sheep and goats, hares and rabbits, and other animals which live upon vegetable matter. There would have been nothing to keep their numbers in check. They would have multiplied to such an extent that the countries in which they lived could never have become the homes of men.

Nature never meant that any class of animals should become too numerous, because that brings trouble all round. It is said that the countries lying near the Mediterranean Sea lost their forests and vineyards through goats being allowed to work havoc. The goats, having no enemies to keep down their numbers, ate up everything they could. They gnawed the vines, they nibbled off the young shoots of trees; they ate the bark of the big trees and so killed them. They destroyed all the green growth upon the mountain-sides, and left a wilderness in place of smiling plenty. By so doing they caused the climate to become changed into one dry and unfavourable to the growth of green things. Where there are forests and green plains the air is never so hot and dry as where all is bare rock and sand. By destroying forests we ruin the climate.

Had the deer and cattle and sheep and goats all been allowed to increase as the goats in the Mediterranean countries were, there would have been far greater damage. The end of it would have been that these animals would have died of starvation, for they would have changed the beautiful places in which they lived into dreary deserts, where nothing would have been able to grow.

If the numbers of lions and tigers and other savage creatures had been allowed to increase without any check, these would in turn have become a deadly peril to us all. But man has become master of the lions and tigers. He is not so strong as these monsters, but he is more clever, and has made spears and guns with which he can kill them. Wherever the white man makes his home, the lion and the tiger have to leave. There is no need now for lions and tigers to keep down the number of other wild creatures that eat herbs, for man can do that himself. He does not want big animals which kill his cattle as freely as they kill the creatures of the forest.

WHEN THE LION CREEPS ABROAD IN THE NIGHT

The story of the war between men and the savage beasts is as old as the history of men in the world; but victory always rests in the end with the man. To-day, in India, lions have become so scarce that nobody is allowed to hunt them; they are looked after and protected almost as deer are protected in this country.

There are lions in other parts of Asia as well as India, but Africa is now the chief home of the lion. Where white men have been living for a long time it is not very often seen, but when men are making their way into new parts, there the lion is a terrible enemy to them. The deer flee away at the sight of man, and the lion, unless he follows the deer, must have cattle, or even men, or else he must starve. So he attacks the horses, and mules, and cattle which draw the white men's waggons, and even kills and eats the men themselves. He comes out of his home at night, and, creeping very quietly up to his prey, springs with great force upon it, and kills it with his great strong teeth and paws. He can carry away a young ox as easily as a cat can carry away a rat. The teeth of the lion are of huge size, and its jaws are as strong as a great steel trap. How does it get the great power which enables it to kill a horse or an ox at a single blow?

THE THREE STRONGEST THINGS IN THE ANIMAL WORLD

Let us fancy that we are looking at those terrible front paws with which it strikes the blow. The leg, or forearm, as it is called, measures 19 inches round, and is made up of the hardest of hard bone, with muscle and tendons as strong as the strongest wire. The foot measures 8 inches across. When this foot strikes an animal the lion shoots out its terrible claws, which are hidden, when it walks, inside the joints of the toes. These claws are like great hooks made of yellow horn. They tear the flesh off an animal as we should strip the peel from an orange. The force with which these claws are driven in is almost more than we can believe. We are told that the three strongest things in the animal world are these: (1) the blow from the tail of a whale, (2) the kick of a giraffe, and (3) the blow from a lion's paw. The forearm of the lion is worked by great muscles at the shoulder, and the blow which it makes is really like the blow from a steam-hammer. No wonder that it can kill a man or a big animal with ease.

The lion and the tiger are the largest of the cat family. They are really great fierce cats. Your pet kitten is simply a young lion or tiger on a tiny scale. Notice the kitten's claws: they are made in the same way as the lion's. Notice how rough its tongue is upon your hand. The lion's tongue is like that, only much more rough. On its tongue little hard points, like fragments of horn, stick up, so that with these the lion can tear pieces of meat from a bone just as if it were using a file.

THE LION'S ROAR IN THE FOREST AND HOW HE GETS HIS SUPPER

Another thing in which the lion is like the cat is that it cannot run fast for a long distance. It can spring a long way, and it can bound along at a great rate for a short time; but, just as a dog can race a cat, so a deer can easily race a lion. So the lion has to be very cunning to catch swift animals for its supper.

When a lion goes out at night, he is fond of making a great noise, as though boasting of his strength and shouting defiance. He puts his mouth to the ground and roars. There is no other sound in the animal world like the roar of a lion; it is so loud, so deep, and so powerful! He goes to a pool, takes a deep drink and then, if he is not very hungry, goes off roaring again. If he is hungry, however, he keeps quiet. He knows that other animals of the region will be coming to drink, and so he lurks nearby until one comes stealing through the darkness, when he leaps upon it. That is one of his ways of catching a supper. There is another way.

Suppose that there are deer right out on the plain. It is of no use for the

THE LORDS OF THE WILD KINGDOM

The lion is the king of beasts, the lord of the forest. A blow from a lion's paw is one of the strongest things in the world, like a blow from a steam-hammer. When he goes to drink at the pool at night, he puts his great mouth to the ground and roars, filling the other animals with terror, and sending them rushing madly to and fro in their confusion, often within reach of the lion's paws. That is how the lion gets his supper.

The tiger, which belongs to the same family as the lion and the cat, has not the grand head and mane of the lion, but it uses its strength just as surely as the lion, and in countries like India hundreds of people and thousands of cattle are killed by tigers every year. When they have once tasted human blood, tigers become very bold, and they will prowl round houses at night and carry off anybody they can catch.

THE FOX, THE JACKAL, & THE WOLVES

The jackal runs like a shadow after the lion and tiger, and picks up whatever they leave. He will eat up anything the lion and tiger leave lying about.

The fox belongs to the same wild family as the wolf. It is handsome, cunning, and bold, and destroys the farmer's fowls and ducks.

This picture shows us a pack of wolves hunting for food. They hunt together in large numbers, and in the winter, when the ground is under snow and food is hard to find, they run for miles, chasing horses and men. Sometimes the driver has to let loose a horse to satisfy the wolves and enable him to get away with the others.

lion to go galloping out there, for the deer would see him and rush far away. There may be scattered rocks to enable him silently to creep from one to another, and so get near, ready to jump out. But suppose that there are no rocks; then he cannot get near. In that case two lions have to hunt together. One lies down and hides. The other lion goes quietly off in the reeds and bushes at the edge of the plain, until he can get round to the back of where the deer are feeding; then he dashes out with a roar. The deer rush away in terror, with the lion after them. Though he cannot keep up with them, he can keep near enough to drive them towards where the other lion is hiding. In an instant, when the deer draw near, this lion bounds forth, strikes right and left with his great paws, and at each stroke he kills a deer, and so gains a supper for himself and his friends.

A LION THAT SAVED THE LIFE OF A MAN

When caught young, lions can easily be trained and taught to do tricks with their trainers. We often see them do this in menageries and circuses, where men are foolish enough to risk their lives to perform with wild beasts. But though the lions will do as their trainer wishes, they would kill anybody else who went into their den. A terrible thing happened in Paris a few years ago through a stranger going into a den of lions. A man had to perform with nineteen lions. Six of them he himself had trained, but the other thirteen, although they had been trained, did not know him. The moment he set his foot inside the great cage he slipped. One of the strange lions jumped at him and knocked him down; the other strange lions at once rushed upon him and began to bite him. It seemed as if he must be killed.

Then a strange thing happened. The biggest lion of all the lot flew at those which were biting the man, and began to attack them with all its strength. That was the trainer's own favourite lion, and it was now fighting to save his life. So bravely did it fight that, although it was badly bitten, it kept the others off until men could open the door and drag its master out.

He was very much hurt, and was in a hospital for nine months before he could walk. The bite of the first lion had broken his leg; but in the end he got better, and often performed with the lion which had saved him.

THE STORY OF AN OLD LION AND A BRAVE LITTLE DOG

Many lions are born in zoological gardens. The Zoo at Dublin is famous for its young lions. Most of those born at the London Zoo die, but those born in Dublin are nearly always strong and healthy. One of the Dublin lionesses lived there so many years that her children numbered fifty. When she grew very old she was not able to move about as quickly as she had done. The result was that horrid rats used to get into her cage, and, finding that she was no longer nimble, they used to bite her feet. The poor old lioness was much troubled in this way, so that her life became a misery to her.

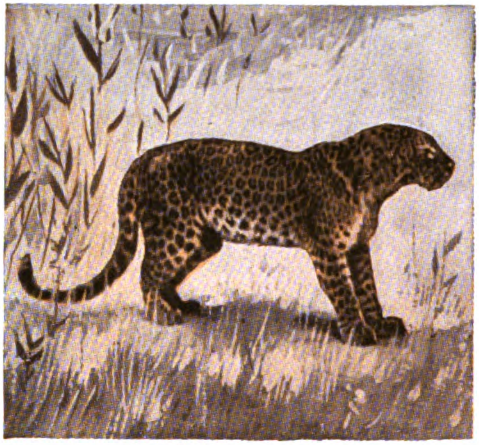
At last things became so bad that her keeper put a brave little dog into the cage. As soon as the dog went in, the old lioness got up to kill it, but the dog took no notice of her. He saw a great ugly rat in a corner of the cage, and he meant to have that out of the way even if the lioness killed him the next minute; so he flew at the rat and killed it. Then the old lioness sat down and thought. This little dog, she saw, had been sent not to annoy her, but to be a good friend. So she showed him that she meant to be friends with him. And each night after that, before she went to sleep, she used to call the little dog to her and fold her great paws round him; and so they used to go to sleep together, the dog's head resting on the broad chest of the lioness. No rat dared to go near her after that, and she passed the rest of her days in peace.

THE SWORD-TOOTHED TIGER THAT LIVED IN PAST AGES

The tiger is more to be feared, perhaps, than the lion. It does not live in Africa, but is to be found nearly all over Asia, and especially in India. It is cunning and cruel; it will kill animals when it does not need food. It has not the grand head and mane of the lion, but it uses its strength just as surely.

Once there were tigers in America, as shown on page 133, more terrible even than those living to-day. They

MEMBERS OF THE GREAT CAT FAMILY

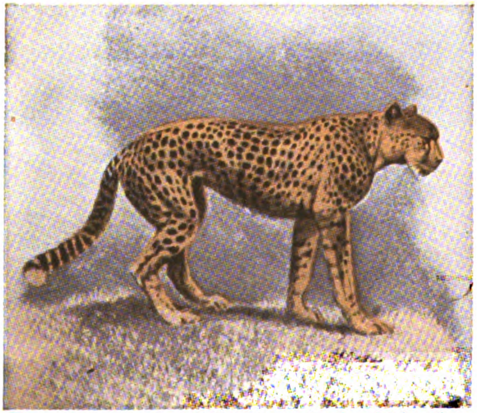


The wild leopard climbs trees, which lions and tigers do not. The leopard crouches on a bough and lies in wait to spring upon an animal passing underneath.

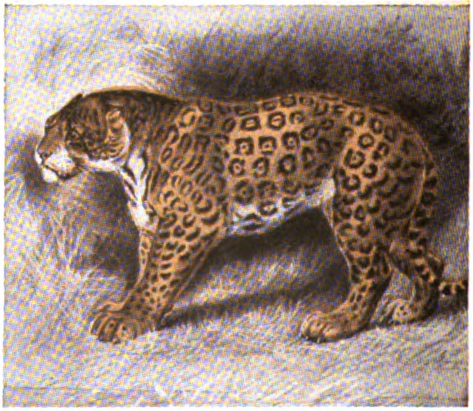
The lynx climbs trees and eats birds. It has wonderful eyes, and whenever we speak of anybody who seems to see everything we call him "lynx-eyed."

The snow-leopard can live where it is very cold. It has a coat of warm fur nearly white, so that it can steal unseen over the snow and pounce upon its prey.

The puma, which people in America call the "American lion,' kills cattle and horses, but never attacks a man unless the man attacks him first.



The cheetah is one of the few animals which, after being caught wild, can be made to serve man, and in India princes keep many cheetahs to hunt antelopes.



The jaguar is a more terrible-looking beast than the leopard, having much thicker legs and a heavier head. Like the leopard, it has a spotted coat.

LITTLE ANIMALS THAT WORK FOR NATURE

Our dogs were all wild, like these, once upon a time, and there are still wild wolf-like dogs in Ireland.

This is a ferret, the ferocious little animal which men keep for "ferreting" out rats. It is a kind of polecat.

This is a weasel, found in nearly all American woods where birds and rabbits are. It likes to rob birds nests.

This is a pine marten, which can twist and turn its long, thin body like an eel. It kills and eats sheep.

This is a polecat, which does great harm when wild by killing poultry and eating eggs. It has a horrid smell.

This is a badger, a shy, handsome animal with long, fine hair. It has very terrible jaws for its size.

This is a civet, a little animal with sharp teeth, with a valuable scent which men collect for making perfumes.

This is a mongoose, the little long-bodied animal which men tame because it kills snakes, rats, and mice.

The picture of the pack of wolves is by Robt. Morley, R.B.A.; the other illustrations are by Gambier Bolton, H. Dixon & Sons, Lewis Medland, C. Reid, Dando, G. Rankin, and Douglas English.

THE HYENA & THE BROWN & POLAR BEARS

The hyena is a fierce, ugly creature, which hunts in packs at night and steals everything it can get. It is a cowardly animal, with great power in its teeth.

This is a big brown bear, which climbs trees and **might kill a horse or a man. These bears generally live in caves and sleep through the whole winter.**

The Polar bear lives near the North Pole, at the very top of the world, where it is all ice and snow. He lives chiefly upon seals and walruses, but if he can he will kill and eat a man. In winter the female bear buries her**self in the snow and does not wake up until the spring, when she generally takes her husband a little baby bear.**

had two teeth which the tiger of to-day has not got. These two teeth were great blades which grew down from the upper jaw. They were like sword-blades, and the name given to that tiger is the "sabre-toothed" tiger. It had legs bigger and stronger and claws more powerful than the tigers of to-day. With its great teeth and big mouth it could break the backs of huge beasts such as then lived.

HOW THE TIGER HUNTS HIS PREY

Animals are often coloured like the scenes in which they live. The lion loves the open ground, so its fur has become a mixture between yellow and grey, like the sand and rocks. The tiger hunts in marshes or among long reeds and grass, so its coat is a fawn colour with stripes of black, or a colour almost black. When it crouches down among the reeds, or tall grass, it looks like the ground, with shadows of the reeds showing on it.

Although lions and tigers kill men and men's cattle, they do not do this all their lives. Lions like antelopes, zebras and giraffes. The tiger eats deer and wild pigs and pea-fowl. When the tigers get old, or after they have been injured, it is less easy for them to catch wild prey, so they creep nearer to the homes of men, and take their cattle. The tiger does this very often in India. The poor natives who are set to guard the cattle are terribly frightened when they see a tiger, which, twice in a week, will carry off a cow. The man runs away, and so shows the lion or tiger that he is afraid. When it sees this, the animal will not trouble to attack the cattle, but will spring upon the man and take him.

THE TIGER IN INDIA THAT TRIED TO CATCH LORD CURZON

Hundreds of people and thousands of cattle are killed by tigers every year in India. The natives are not only afraid of the tigers because of what they do; they are afraid of them because they believe that men, after eating a certain root, die, and are turned into tigers. When they have once tasted human blood, lions and tigers become very bold, and will visit men's dwellings at night and carry off anybody who is not in his house. One tiger in India killed 127 people, and caused such fear that for six weeks nobody dared to go near the village against its home. Once, when Lord Curzon was resting at a monastery in Korea, where he was travelling, he heard sounds about the passages, and in the morning he found that a great tiger had been prowling round, trying to catch him for its supper.

There is not a more beautiful animal in the Zoological Gardens than the leopard; neither is there an animal more cruel. There is a leopard in London which the Prince of Wales brought home from India. It bit a man's arm off when he went on board a ship. Another leopard at the London Zoo plays with its keeper when there is nobody else about. It was born in India and tamed by a lady when quite a tiny thing. It was very fond of her, and used to romp with her like a big kitten. But as it grew up it got so strong that it used to tear her dresses to pieces with its great claws when playing with her, and there was always the fear that some day it might hurt her, taste blood, and kill her. So she sent it to the Zoo, where it is now.

LEOPARDS HIDE IN TREES AND SPRING UPON THEIR VICTIMS

Leopards are more like tigers than lions, for they have no manes, but they are spotted, instead of striped, as the tiger is. When wild, they are even more to be dreaded than the lion or the tiger—for they climb trees, which lions and tigers do not. They crouch down on a bough, and as a child or an animal passes underneath they spring down and kill it. A cat loves to play with a mouse before killing it, but the cruel leopard seems to love to kill simply for the sake of killing. One night two full-grown leopards and three young ones got into a sheepfold in South Africa, and killed nearly a hundred sheep. It is a most cunning animal. Though it will not attack a man who has a gun, it will spring on a poor native who is unarmed. But women and children have most to fear from it. A single leopard in India killed a hundred women and children as they came to draw water at a well.

Some leopards can live where it is very cold. These are called snow-leopards. They live high up in the mountains, where snow nearly always lies, and then their fur is long, to keep them warm, and nearly white, so that they may steal unseen over the snow upon their prey. When captured and brought into a warmer climate, where there is no longer any snow about, the coat of the snow-leopard often becomes darker.

The jaguar is a more terrible-looking beast than the leopard. It has much thicker legs, its head is heavier, and the spots upon its coat, instead of being round rings, like those of the leopard, are shaped like rosettes. Like the leopard, it climbs trees, and pounces down upon its victim. Its home is in America, where it attacks nearly every animal.

THE PUMA, THE ENEMY OF THE DOG AND THE KIND MAN'S FRIEND

Another of the big cats like the leopard is the puma, which men in the West call the mountain lion. The puma can kill a horse or an ox, but of all things it best loves the flesh of the dog. It can be tamed, but you must not let it see a dog, for that will tempt it too much. A tame one at a menagerie was taken out of his cage to the front of the show. All went well until it saw a dog in the crowd. Master Puma forgot that he was tame. He bounced off the show into the middle of the crowd, sending the people screaming in all directions. He killed the dog, then, seeing another, he raced on and killed that. Then he went back to the menagerie, carrying one of the dogs in his mouth.

There is this to be said of the puma: although he will fight the jaguar and the bear, and will kill cattle and horses, he rarely attacks a man unless he is himself first attacked. People sleep without any protection when they know that pumas are about, for they call him the kind man's friend.

HOW THE CHEETAH IS MADE TO HUNT THE ANTELOPE

One of the few savage animals which, after being caught, can be made to serve man is the cheetah. If he is caught wild, he can be taught to hunt for his master; but he cannot be made to do this if he has been born in captivity. Princes in India keep many cheetahs, just as many men in England keep packs of hounds for hunting foxes. When it has been trained, the cheetah is taken near to where there are deer or antelopes. At first its head is covered with a hood; when this is taken off the animal creeps away to where it sees the deer, and, springing upon one, catches it for its master. It is like the leopard, having a spotted coat, but it cannot climb trees.

When we speak of anybody as "lynx-eyed," we mean someone who has very good sight, who seldom fails to see anything which is to be seen. That name is taken from the lynx, a wildcat with tufted ears, which climbs trees and eats birds, but in Canada lives mainly on hares and mice. The polecat is another fierce animal with an unpleasant scent. It can be trained to catch rabbits if caught young; but when wild it does much harm by killing poultry and eating eggs. It belongs to the same family as the stoat and weasel, which rob nests and kill rabbits. These are to be seen in nearly all English woods where birds and rabbits are to be found. The ferret, which men use to "ferret" out rats, is a sort of tame polecat.

The weasel family is a big one. It includes the otter, which swims and dives splendidly and catches fish; the glutton, which lives in the cold countries and is a terrible foe to the beaver; the stoat, with its brown coat in summer and white coat in winter, and its everlasting appetite; and the weasel itself, which eats rats and mice and birds. If a stoat or a weasel gets into a poultry run, no chickens will be left alive.

THE LITTLE SHARP-TOOTHED MEMBERS OF THE WEASEL FAMILY

The pine marten is another of these little animals with long, thin bodies. They are terrible little creatures, though they are so handsome. Some years ago a farmer in Ireland had fourteen out of twenty-one lambs killed, and the next night the other seven were served in the same way. When a search was made it was found that the whole of the damage had been done by two pine martens. This marten lives mostly in northern forests, and is one of the most valuable of the Canadian fur-bearing animals.

The most famous of the weasel family is the sable. This is a little animal which has a brown coat in summer, but turns white in winter when the snow comes. Its fur is so precious that men go into the cold, frozen wastes of Siberia to catch it, and in seeking it they have explored and made maps of lands where civilised men had never been before.

Another animal with a scent is the civet, which lives in Africa. The scent of this one is not unpleasant, but is valued, and the civet is kept tame, so that men can always get a supply of the scent. This is passed from the animal's body, like wax or honey, into a little pouch, from which it is removed by men who sell it to be used for making perfumes.

A little long-bodied animal which is much prized is the mongoose. Men tame it and have it about their houses, because it kills snakes and rats and mice. So long as it is kept under control, all goes well; but if it is not controlled, then woe betide its master. Many years ago the island of Jamaica swarmed with rats. These creatures ate the sugar-canes and ruined the planters. A number of mongooses were taken there from India, and turned loose in the fields. They quickly killed and ate the rats, and then people would have been glad to get rid of them. For they killed all the useful little animals in the island, and became as big a plague as the rats.

THE BEAR THAT LIVES IN A WORLD OF ICE AND SNOW

In the frozen Arctic regions the animal which men most dread is the Polar bear. It is not so fearful a bear as the one which used to live in England. That was called the cave bear, and was so big that two cave bears would have weighed more than three of the biggest bears in the world of to-day. The Polar bear lives chiefly upon seals and walruses, and on the flesh of whales, but if he can he will kill and eat a man.

In winter the female bear goes some distance away from the sea and lies down and buries herself in the snow. Then she goes to sleep for the whole winter, while her husband is out getting food and keeping himself warm as best he can. When she goes out in the spring from her snowy home, the she-bear generally takes a baby bear with her to show to her husband. The Polar bear can swim, and can make his way over smooth ice where no horse or man could go, the reason being that his great feet are covered with little hairs, which prevent him from slipping.

The Polar bear would, perhaps, not know what to do if he came to a tree; but the black bear, or any other bear which does not live in the Polar regions, would know what to do. They would climb the tree if there were a bees' nest or a man at the top. Wherever there is food they will go. They will eat roots or berries; they will eat honey; they will catch and kill a horse or a man; they will eat the body of a man or an animal which has died. Nearly all the bears go to sleep in the winter. They get so fat in the summer that, while they are sleeping in the winter, they can live on the strength which is stored up in their fat. They are thin and hungry when they come out of their hiding-places in the spring. That hiding-place is generally a cave or some other hole; it may even be the inside of a great hollow tree.

THE WOLVES THAT CHASE THE HORSES IN THE GREAT RUSSIAN WILDERNESS

The wolf is not so big an animal as the bear, but he is more to be feared. There are so many wolves, and they travel so fast and so far. They hunt together in large packs, and in the winter, when snow is on the ground and food is hard to find, they run for miles and miles to chase horses and men.

In Siberia and Russia, and other cold countries, wolves hunt men who are driving in sledges. No matter how quickly the frightened horses gallop, the wolf can keep up with them. Sometimes the driver is compelled to cut the harness of one of the horses and let it go, so that the wolves may seize that, and enable him to get safely away with the other horses. But if there are many wolves, some will still follow the man, and in the end run him down. If, while he is being chased, the man shoots a wolf, some will stop and eat the one which drops, but the others go on. When hunting animals they are just as determined. Two will hunt a deer as the lion does, one lying in hiding while the other drives the deer towards it. Wolves are found in many parts of the world, and in America there are two kinds, the gray or timber wolf, which has been described, and a smaller prairie wolf, or coyote, which is not dangerous, but is a great pest to Western farmers, killing their lambs and poultry.

THE CUNNING FOX AND THE WAY IN WHICH HE CHEATS HIS HUNTERS

A small cousin of the wolf is the fox, of which there are several kinds. The best known is the red fox, which Englishmen on horseback hunt with hounds. It is a handsome but cruel animal. Like the leopard, it will kill all it possibly can.

In one night it will kill scores of fowls, though it needs but one or two.

The fox lives in a hole burrowed in the ground, or in the root of an old tree. Sometimes it will share a burrow with a badger. The badger is a shy, handsome animal, with long, fine hair. No other animal of its size has such terrible jaws. The badger and the fox do not fight, or it would be bad for the fox. Sometimes they live together in a burrow which has two little rooms at the end. In one the mother fox rears her babies, and in the other the badger nurses hers. Although the fox does not bite so hard as the badger, its bite is dangerous, and men have gone mad from a wound caused in this way.

The fox is as bold as it is cunning, and, like the skunk, the fox has a strong smell, and wherever it goes it leaves traces of this smell. It is this which the dogs are able to follow. They can chase a fox which they cannot see. They do not look for the animal; they simply keep their noses to the ground, and follow wherever the scent leads them. The same sort of red fox lives in the United States, but here it is not hunted on horseback, but with traps for the sake of its pretty fur. In the Southern States lives a smaller kind, the gray fox, which often climbs trees.

THE WILD DOGS, THE WOLVES, THE JACKAL, AND THE HYENA

Our dogs were all wild once upon a time. The dogs and the wolves and the foxes and the wild dogs still living in places abroad all come from the same father and mother, far back in the ages. There are still to be seen in Achill Island, off the West Coast of Ireland, dogs which are simply little wolves and nothing else. We need not be surprised, then, that the ways of wild dogs and wolves are alike. Wild dogs hunt just as the wolves do. They will attack any animal when they are hungry. The wild dogs in oriental towns keep the streets clean. They come into the towns at night and eat up all the refuse, and so help to keep these places healthy.

The jackal does a similar thing in India. The jackal is really a smaller kind of wolf. He is a wretched creature, and runs like a shadow after the lion and the tiger. When the tiger has killed an animal and eaten as much as it wants, the jackals, which have been humbly creeping round about, rush out from their hiding-place and devour the rest of the carcase. They eat up the filth of the villages; but they are great thieves, and dogs have to be kept to prevent them from doing still greater damage. They have a nose which is less pointed than that of the fox, but sharper than that of the ordinary wolf; and they have a tail like the fox.

If there is a more unpleasant animal than the jackal, it is the hyena. But, ugly and horrid as they are, they are important to the health of the countries where they live. If wounded animals get away and die in the forest, or if animals be left only partly eaten, their flesh, if allowed to lie in the sun, would become poisonous. But where hyenas are about, this thing never happens. They set out in packs at night, and clear up whatever flesh they can find, not even leaving the bones.

HOW THE HYENAS HUNT IN PACKS BY NIGHT

The power of their teeth is wonderful. The thigh-bone of a great ox is cracked by the hyenas as easily as if it were a nut. When there is nothing else to be found in the wilds the hyenas make for the villages, and eat up all the rubbish that can be found there. If they did no more than this they would be valuable; but they steal everything they can eat. They are such cowards that they dare not attack an animal which is standing still; but if they can start it running they will fight. They creep up to an ox or a horse, and jump up suddenly in front of its nose to frighten it. This will very likely start the creature running away. That is just what the hyenas want. They rush after it, howling and biting at its legs, to get it away from its companions. When the poor thing is weary from running and from loss of blood which the many bites have caused, it sinks to the ground. The hyenas then rush on to it and tear it to pieces, and leave not one unbroken bone of it by the morning.

There are too many hunting animals in the world for us to note each one by name, but we have considered the most important in the groups to which they belong. All those whose habits we have now studied are called carnivorous, which means that they eat flesh.

The next nature stories are on page 201.

The Child's Story of THE EARTH

WHAT THIS STORY TELLS US

We know the earth spins through space like a ball, spinning round once in a day, and travelling round the sun once in a year. But the earth was not always a great ball. Once it was a great cloud, made of the stuff of which the earth is made, and of which our bodies are made. The cloud was moving, spinning round until it came together, shrinking into the shape of a globe, and at last becoming solid. Spinning in space at the same time were other great clouds. We call them planets, which means wanderers, because they wander through the sky. They are the sun's family. One is so near to the sun that it goes round it in 88 days; one is so far away that it has only been round the sun 12 times since Jesus Christ was born. All round these planets are other worlds called moons, and millions of strange and wonderful things which go through the universe spinning.

THE SUN AND HIS FAMILY

CONTINUED FROM PAGE 80

Now we must take up the story of the earth from the beginning. As we know that the earth is not in the middle of the world, but that it goes round the sun, we must be very sure to find out all that we can as to what the sun is, and why it makes the earth go round it. We could not live without the sun, and we cannot know too much about it. Where, then, have the sun and the earth come from, and what were they like at first?

We have seen that, as the earth spins round itself, it moves round the sun, and so we know that, so to speak, the sun is a neighbour of ours. Now we must find out whether we have any other near neighbours, and we find that we have. There is, for instance, the wonderful moon, the story of which is part of the story of the earth. But also we see in the sky a number of bright objects that look like stars, but which, for several reasons, we know are different from the stars, that we also see when we look upwards. These bright objects are not stars because, for one thing, they move about the sky, while the real stars seem to be fixed, and for ages past have been called the "fixed stars." Since they are always seen to be moving, the men of long ago called them the wanderers; but, of course, those men did not speak English, but Greek, and we now use the Greek word when we speak of them. They are called *planets*, which just means wanderers.

Now, of course, when we talk of wandering we think of a movement that is haphazard and does not quite know where it is going. That is not true of the planets, even though we call them wanderers. We know now that these planets all move round the sun just as the earth moves round the sun, and in just as orderly a way. That is why we may talk of the sun and his family. We must think of the sun as a great light and furnace in the centre of our part of the great world.

Around him there travel, from one year's end to another, a wonderful family of planets. One of these is the earth. She is not the biggest, nor the smallest, nor the nearest to the sun, nor the furthest from it. They all go round the sun in the same direction—they go the same way; but, of course, if a planet is further away from the sun than the earth is, it will have much further to go before it can get right round the sun and come back again to the same place. This takes it very much longer time, then, and so "from one year's end to another" would mean something very different on that planet from what it means to us. Our earth may go round the sun more than a hundred times whilst one of these other planets that is much further away from the sun goes round only once.

But all that does not matter at present. The great fact is that our earth, which is so important for us, is really just one of several planets that go round the sun. It is our sun and their sun. Now, the Latin word for the sun is *Sol*, and so this great system, made up of *Sol*—the sun—and all his planets is called the *solar system.* Plainly, then, we shall not be able to tell the story of the earth unless we know the story of the solar system, for the earth is part of the solar system.

THE TIME WHEN THERE WAS NEITHER EARTH NOR SUN

You will remember that men used to think that the earth was flat and still, with the sky above it, and the fiery under-world below it? How different that is from what we know now—that the earth is a ball, one of a number of balls that are always flying round the sun!

Now at last we can begin at the beginning of the story of the earth. We must go back to a time when there was no earth at all, when there was no sun at all, and no planets at all.

There was only, in those far-away times—we cannot say those far-away *days*, for there could be no days when there was no sun or earth—there was only in those far-away times some great cloud of stuff, so much bigger than any cloud you ever saw, so much bigger than anything we know, that not even the wisest of wise men can really make a picture in his mind of how big that cloud must have been. There it was, however. Enormous though it was, it was only a cloud. If we could have been there to see it we should not have found much to say of it, except simply that it was there and that it was very big. All parts of it were like all other parts. It was just a cloud, and if you had tried to draw a map of it you could only have drawn its edge all round, for there was nothing else to draw in it.

THE STUFF THAT WE ARE MADE OF WAS IN THE GREAT CLOUD

Some people think that it must have been a very bright and even a very hot cloud, giving out light and heat from itself; but most people think that this was not so, and that at first, at any rate, this cloud was not bright or hot, but perhaps very cold.

Now, I suppose, you guess what is coming. That great cloud was made of the stuff which now makes up the sun and the planets, including our own earth, and even the stuff of which your body is now made, and the stuff which is before you and which you call paper. All the stuff, or matter, as it is called, that now goes to make the solar system—the sun and his family—was there in that great cloud. There was no system, however. The cloud had no particular shape, and one part of it was just like another.

There was only this to be said—if *we*, and not merely the stuff of which our bodies are made, had been there to say it—and that is that all the little bits of which the cloud was made up were moving. They were probably rushing about in a very rough-and-tumble sort of way. Nothing could have been less like a system of any kind. This all happened so long ago that we simply cannot think how long ago it was, any more than we can really think how big the cloud was. But, as the ages went on, all the little bits of stuff that made up the cloud found themselves moving, not like a jumble, but in a more orderly way. Indeed, so orderly was their movement, after a long time, that the whole great shapeless cloud slowly began to twist or spin on itself.

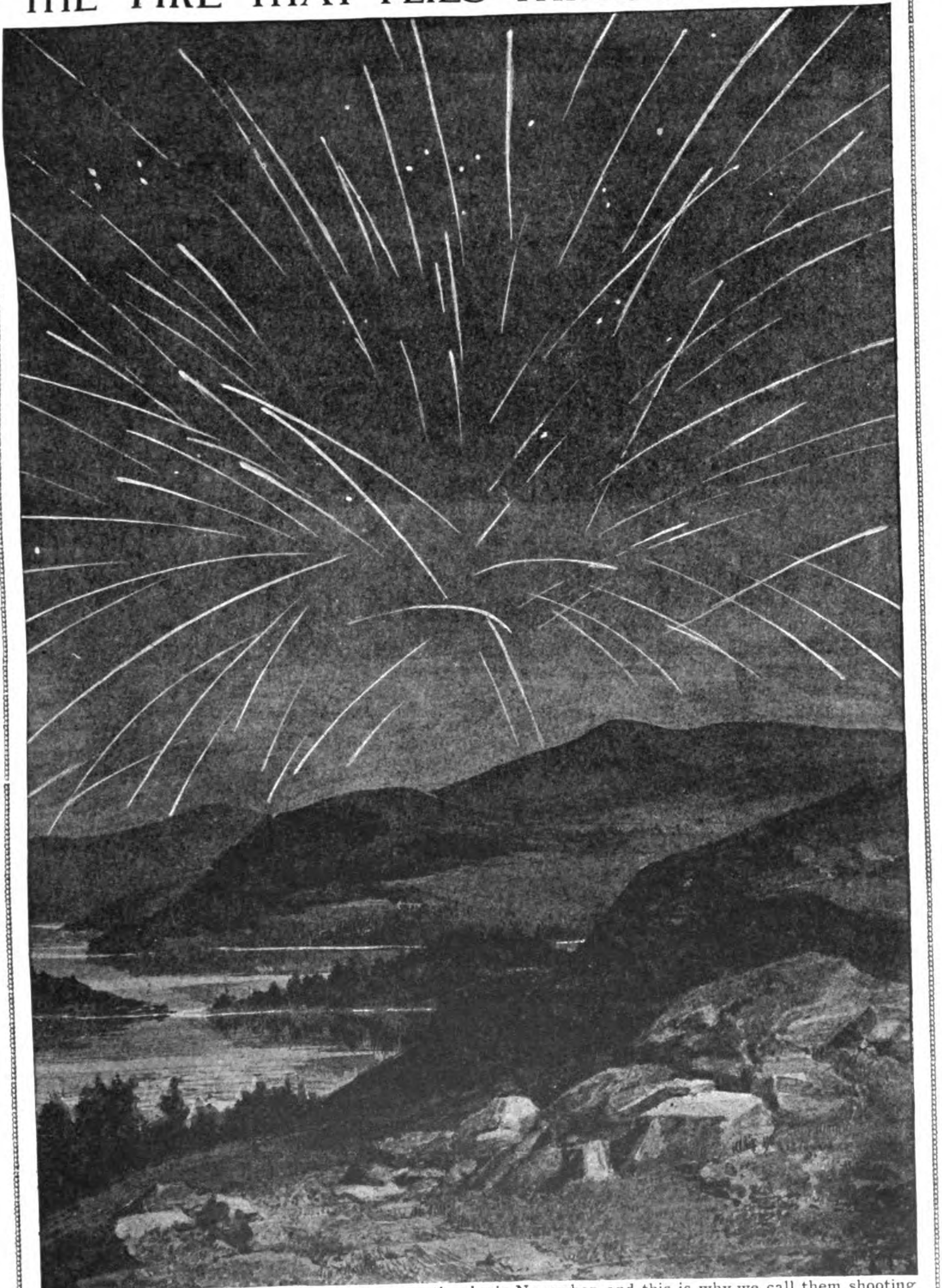
WHEN THE SPINNING OF THE EARTH BEGAN

Now, that reminds you of the earth spinning on itself, and so it should, for the slow spinning of this great cloud was the beginning of the spinning that makes our night and day. The stuff that makes the earth was set spinning in that cloud, and it has been spinning ever since; it is spinning now, and in the same direction as when it first began. But there was no earth yet, nor sun, nor solar system; there was merely this spinning cloud.

As time went on it began to shrink. This we can be quite sure of, for we know that every speck of stuff in the whole world tries to attract every other speck of stuff in the world. That is why a ball falls to the earth when you let it go, as we shall see later. Now, if in this enormous cloud all the little parts were pulling upon each other, of course it would shrink, for those on the outside would have all the others pulling them inwards and none pulling them outwards.

We have made up our minds to try to find out where the sun and the earth come from, and what they were like at first. But before we do that we must look for a little while at what we

THE *FIRE* THAT FLIES THROUGH SPACE

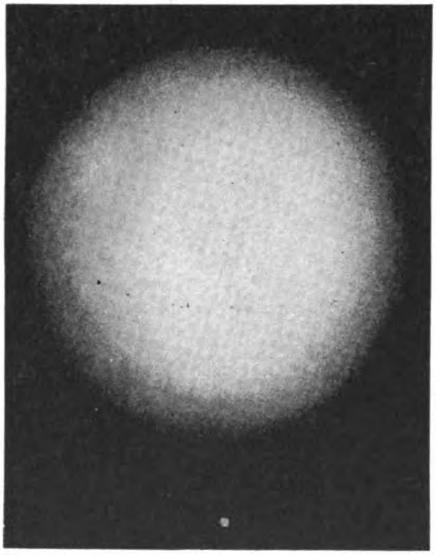


We may often see lights like these shoot across the sky in November and this is why we call them shooting stars, but they are not stars. They are very little things, some as big as pebbles, some as big as cricket-balls, which the earth has caught as she flies through space, and sends spinning through the air so fast that they are made hot and bright by their flight. Once a comet, a star with a tail of fire, disappeared, and in its place are now many of these flying lights, which we call "meteorites," after a Greek word meaning something raised high above the ground. The missing comet has, no doubt, broken into pieces which have become meteorites. We see them best in November because then the earth is in the path taken by many of these little wanderers.

may call the brothers and sisters of the earth—heavenly bodies that began as the earth began, and that depend upon the sun in the same way. These heavenly bodies, together with the sun and the earth, make up a little family which is complete in itself, and is, in a way, independent of the rest of the world. This little family, since its centre is the sun, the Latin name for which is *Sol*, is known as the solar system. What, then, are the other bodies, not unlike the earth, that go to make up the family of the sun?

Ages and ages ago, men who watched the face of the heavens found that amongst the stars there were some few which behaved quite differently from the rest. All the heavenly bodies, of course, seem to rise in the east and set in the west; but that, as we have seen, is simply because the earth, from which we behold them, is twisting round the other way. Apart from that movement, which is only apparent and not a real movement, men found that all the heavenly bodies except a very few were fixed in their positions. If we take, for instance, the stars that make up what the ancients called the "Great Bear"—part of which we often call the "Plough"—we find that, year after year, they are always found in the same position. The brightest of the stars had their place in the heavens noted thousands of years ago, and, so far as we can tell without very careful study, they occupy just the same places now. We have lately learnt that really they are moving, but they are so far away that, to the ordinary eye, nothing can be noticed even in the course of many years. These stars, then—that is to say, all the stars except a very few—were called *fixed stars.*

HOW THE EARTH HAS SHRUNK INTO ITSELF

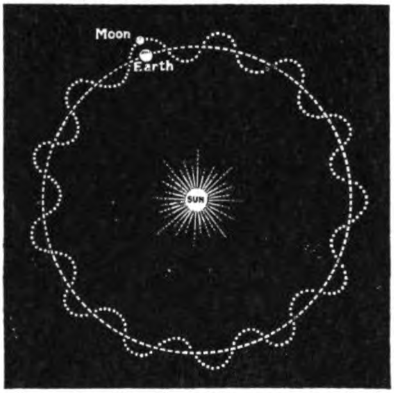


The earth was once a cloud moving in space. The cloud was made of the stuff of which the earth is made, and as it spun round, the great cloud began to twist or spin on itself. It became like a globe, as in the top of this picture, and shrank until it became the solid earth on which we live, which the dot in the picture represents.

On the other hand, one or two bright stars could be seen, including even the brightest of all the stars, that were quite different in the way they behaved. They were not fixed, but moving, and their movement could be seen quite easily from day to day or week to week. In one month you might see one of these very bright stars seeming to lie right inside the "Great Bear" or the "Plough," but in another month it would not be there at all. Therefore, a special name was given to these stars which moved or wandered about the heavens, and which were, therefore, so very different from the fixed stars. They were called *planets*, which is simply the Greek word meaning "wanderers." Amongst them was, for instance, the morning star, or Venus, which outshines all the fixed stars; another was Jupiter; and another, because of its reddish colour, was named after Mars, the god of war.

It was a very difficult matter for the old students of the heavens to explain the movements of these planets, or wanderers, and all sorts of curious ideas were suggested, but none of them quite met the case. The truth was, of course, that the old students were without the key to the whole difficulty. We know now that these planets are quite different in every way from the fixed stars, and that from age to age they go on circling round the sun just as the earth does. The planets are not stars at all; compared with the fixed stars they are much smaller than a pin's head compared with the dome of St. Paul's Cathedral. They are so bright simply because they are so near us. All of them put together and added to one of the fixed stars would make no difference that could be noticed at all. More than that, they do not even shine by light of their own, but only by the light of the sun, which strikes upon them, and then is thrown back to us upon the earth, just as a ball is thrown back from a wall. Those planets owe all their light to the sun, and if we were upon one of them we should see the earth shining in the sky very brightly and behaving like a planet. Indeed, the earth is one of the planets, and shines by sunlight just as they do. Not only so, but the earth is one of the smallest of them.

HOW THE MOON GOES ROUND THE SUN



The moon, like the earth, goes round the sun, but instead of going straight round, as the earth does, the moon circles round the earth all the way as shown here.

All the planets, then, including the earth, circle round the sun and make up the family which we call the solar system. This solar system is very much alone in the great world. The very nearest of the fixed stars is so far away that the light by which we see it has actually taken three years to reach us, and light travels so fast that it would go eight times round the entire earth in a second. One of the most wonderful things that we have found out lately is that the solar system is so much alone in the world, so far from everything else.

THE TINY MOONS GALILEO SAW THROUGH HIS TELESCOPE

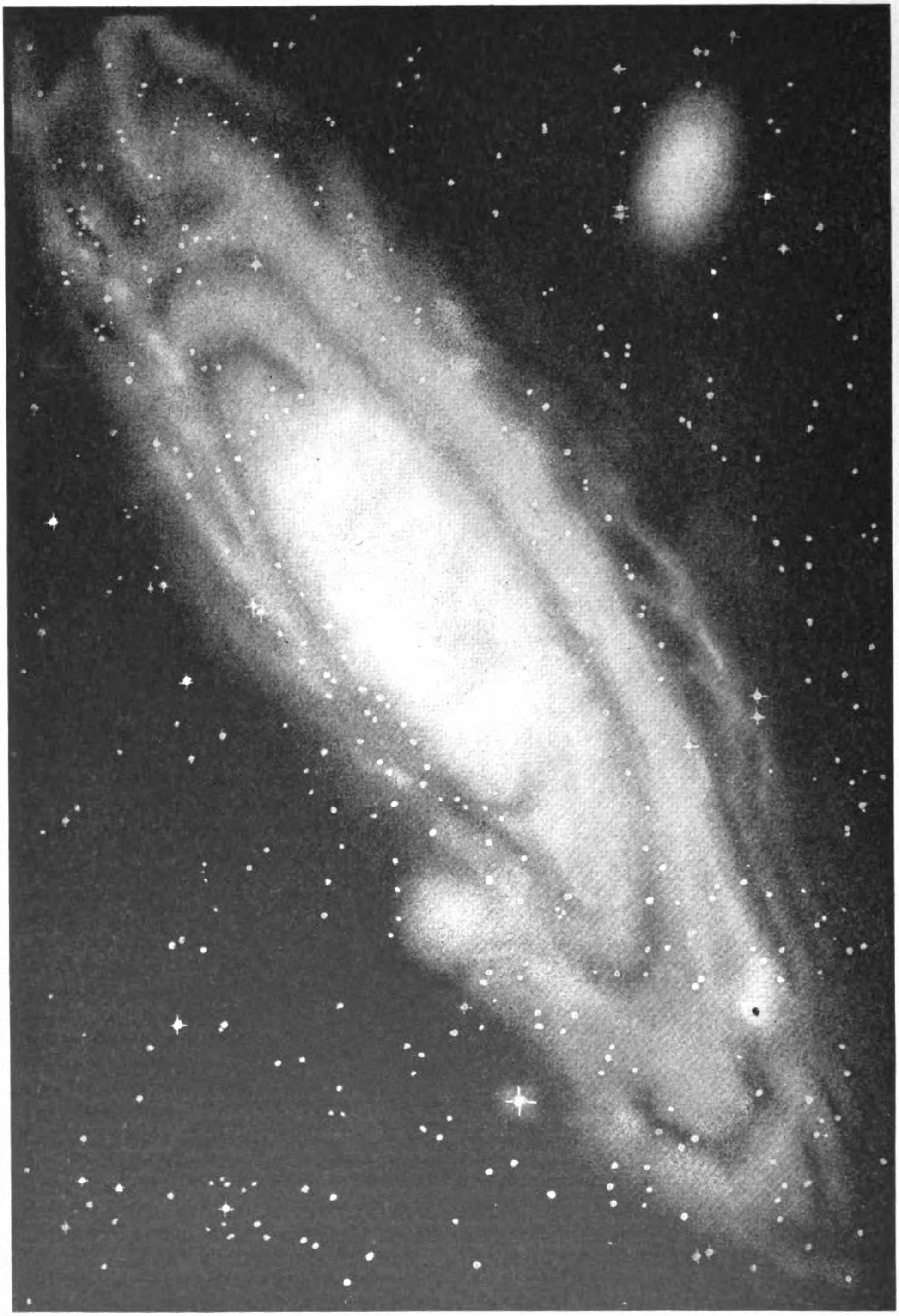
Seven worlds besides ours are for ever circling round the sun, and round them circle many moons. One of these worlds, which we call planets, has seven moons circling round it. Jupiter's moons were almost the first discoveries made through the telescope, and this picture shows the four moons seen by Galileo, the first man who saw them.

All these planets move round the sun, but some of them are much nearer to him than others are. Two of them, we know for certain, are nearer the sun than the earth is. All the rest move round the sun at distances greater than that of the earth.

Now what about the moon, you will say. Well, there is no doubt at all that the moon goes round the earth just as the earth goes round the sun. So, of course, the moon goes round the sun, too, only instead of going straight round as the earth does, it has to keep on circling round the earth all the way. The moon, then, is part of the solar system. Then we have to ask ourselves whether any of the other planets have moons, and the answer is that they have, so that all these moons must be included in the solar system.

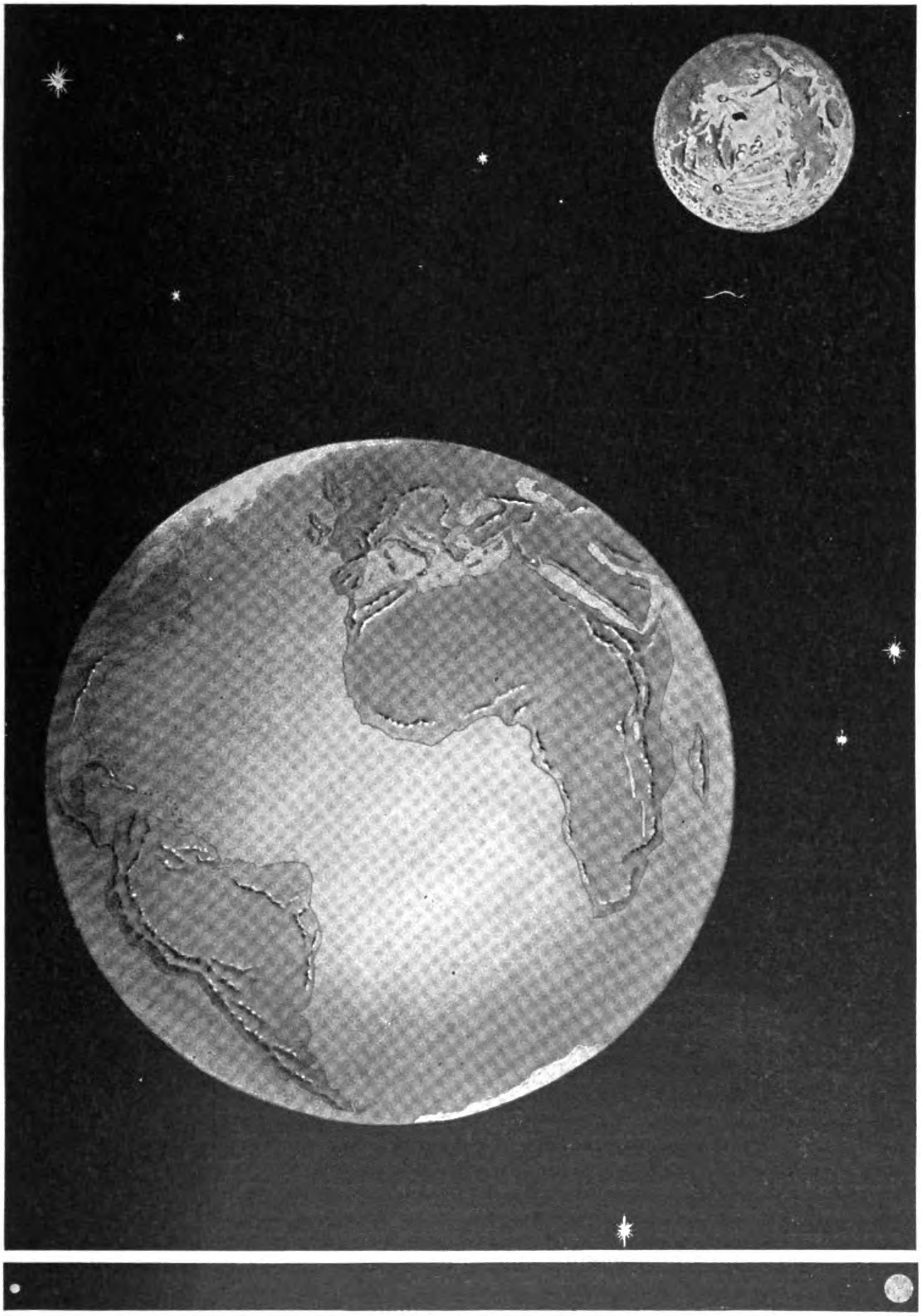
It is not very long ago since the first of these moons were found. They were seen by the great Italian named Galileo, and were almost the first reward he had for inventing the telescope—the tube with glasses in it through which men look at the sky. Galileo looked at the great planet called Jupiter, the biggest of all the planets, and there, with the help of his telescope, he saw what no one had ever seen till then—four tiny moons. As he watched them from night to night, he could see quite plainly that they were going round Jupiter, just as the moon goes round the earth. Sometimes one of them would disappear altogether because it had got behind Jupiter, and then it would turn up again on the other side from where it was last seen. These moons went round Jupiter at different distances from him, just as the planets go round the sun at different distances from him; but they all went round in the same direction.

THE CLOUD OF WHICH THE EARTH IS MADE



The earth began, as far as we can tell, in a great shapeless cloud like this. All the matter of which the sun and his family of worlds are made was in this cloud, which moved through space for millions of years, until parts broke away. The parts shrunk into themselves and became globes, like the earth and the moon opposite.

THE EARTH AND THE MOON IN SPACE



This shows what the earth and the moon are like to-day. As the cloud opposite broke into pieces, the separate parts began to shrink, and one part became the earth. Every speck of stuff in the world tries to draw every other speck of stuff in the world, and the stuff in the centre of the cloud drew to it the stuff on the outside of the cloud. Slowly the cloud grew smaller, shrinking into itself until it became the solid earth, and part of it broke away and formed the moon. The moon should really be much farther from the earth than is shown here; to show **them at their proper distance we should only have been able to make them the size shown at the bottom.**

The moons of Jupiter will always be specially interesting, not only because they were the first to be found, but also because they gave Galileo a good argument. He was trying to persuade people to believe that the earth and the other planets go round the sun, and it helped him to be able to say that Jupiter, like the earth, had little moons that went round him on his way.

Since that time moons have been discovered going round many of the other planets. So all these moons must be included in the sun's family. The two planets that are nearest the sun have no moons; then comes the earth, which, as we know, has one moon. Some of the planets which go round the sun at a greater distance than the earth are better off. The wonderful planet called Saturn, for instance, has nine moons, and three more moons of Jupiter have been discovered since Galileo's time, so that he is pretty well off with seven. The last two of these were only found about three years ago, and perhaps there may be more.

THE WORLDS THAT FLY ROUND AND ROUND THE SUN

Now, I think, we must have a list of the planets that make up the solar system, and we shall name them in the order of their distance from the sun; also we may put opposite each planet its distance from the sun in miles, the time that it takes to go round the sun, and the number of its moons.

Names of Planets.	Miles from the Sun.	Length of its Year.	No. of Moons.
Mercury...	36,000,000	88 days	0
Venus ...	67,000,000	224 days	0
Earth ...	93,000,000	365¼ days	1
Mars ...	142,000,000	686 days	2
Jupiter ...	483,000,000	12 years	7
Saturn ...	886,000,000	29½ years	9
Uranus ...	1,782,000,000	83 years	4
Neptune...	2,792,000,000	165 years	1

If you look at the second column you will see that we have called it "length of year." Now, you understand that what we mean by that is the length of time the planet takes to go right round the sun, and we measure that by the measures that we on the earth know best. So, when we say that the length of Neptune's year is 165 years, what we mean is simply that whilst Neptune goes round the sun once the earth has gone round him 165 times. So, if we had made a mark at the place Neptune was at in the year 1742, he would just have got back to it now in 1907. That is a long year, is it not?

HUNDREDS OF TINY PLANETS AND "STARS" WITH TAILS OF FIRE

But even this is not the whole of the sun's family, for we have lately found some very tiny little planets, far smaller than the moon, which go round the sun between Mars and Jupiter. All of them put together—and they are numbered by hundreds—would not be nearly as large as the earth. At one time it used to be thought that all these tiny little bodies had been formed by the breaking up of some big planet; but nowadays men are very far from sure that this "shattered planet" ever existed. However, all these little bodies have to be included amongst the sun's family. They are all found, be it remembered, in one particular part of the solar system, and doubtless, if we could discover the history of any one of them, that would also be the history of all the others.

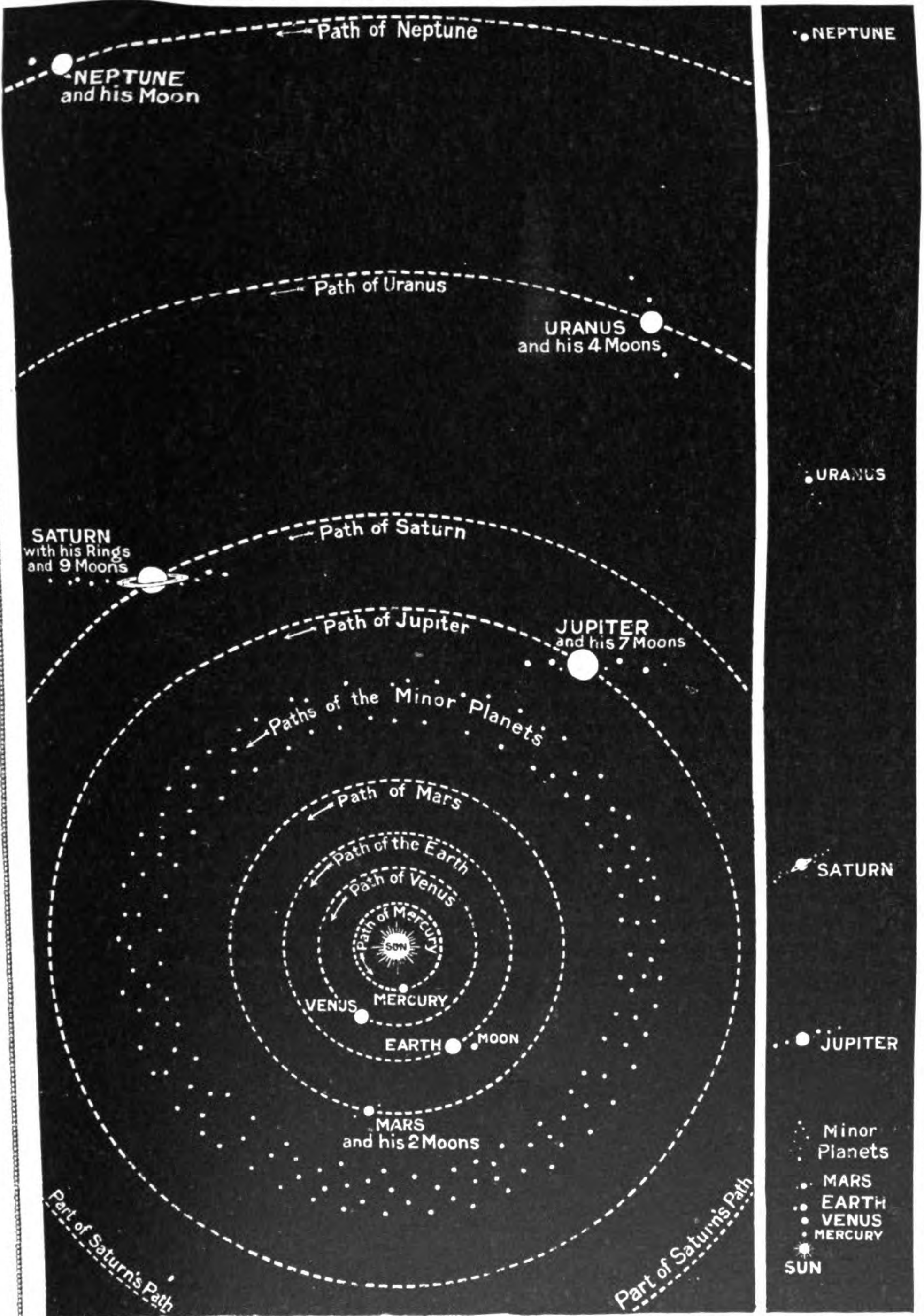
Yet, again, the solar system includes a number of strange and wonderful objects which are utterly different from any of those we have described; they are called *comets*, from the Greek word for hair, because when we can see them best they seem to have long, hairy tails streaming out across the sky behind them. These also travel round the sun, and therefore belong to his family; but they do so in a very curious way. None of the planets go round the sun in circles, but always in paths like a circle that has been rather flattened in one direction.

THE BRIGHT LIGHTS THAT SHOOT ACROSS THE SKY

In the case of the comets, however, this flattening is very extreme, so that the path of a comet would be something like the picture on page 152. At one time in its history the comet is quite close to the sun, and just misses running into him. Then, after passing round the sun, it travels away from him, out and out, cutting across the paths of all the planets and passing millions of miles beyond even Neptune, and then at last it will turn on its course and come back again. But still it is one of the sun's family.

Now, even this is not quite all. You must have heard of what are called

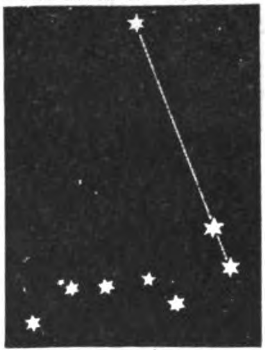
THE SUN AND HIS CHILDREN



The sun is like a great furnace of heat and light in the centre of our part of the universe. Around him travel for ever a wonderful family of worlds, which we call planets. They all go round the sun in the same way, but some members of the sun's family are so far away that it takes them many years to go round him. The earth goes round the sun once in a year, but Neptune, the most distant planet, goes round only six times in 1,000 years. The picture at the right shows the size of the planets compared with one another, and their distance from the sun.

shooting stars, and on any clear night in November you will very likely see some—and also at other times of the year. A flash of light seems to come from nowhere, dart for a little distance across the sky, and then disappear. These, of course, are not stars at all, but quite small things, perhaps the size of a cricket-ball, which the earth has caught as she flies through space, and which, as they pass through the air, are made very hot and bright. What is left of them often may reach the earth, and many of them are to be found in museums nowadays. It seems that throughout the solar system there are countless numbers of these small objects called meteors, from the Greek word meaning raised high, some, perhaps, no bigger than grains of sand, others as big as bullets, pebbles, cricket-balls, and sometimes a good deal larger. These meteors also circle round the sun and belong to his family. In November the earth is apt, in her path, to cut across the path taken by a very large number of these tiny wandering bodies, and that is why we are most apt to see shooting stars in November.

POLE STAR & "PLOUGH"



All stars move, but some so slowly that they are called fixed. Those forming a "plough" are fixed. This picture will help you to find them in the sky. The top star is the bright Pole star, right overhead.

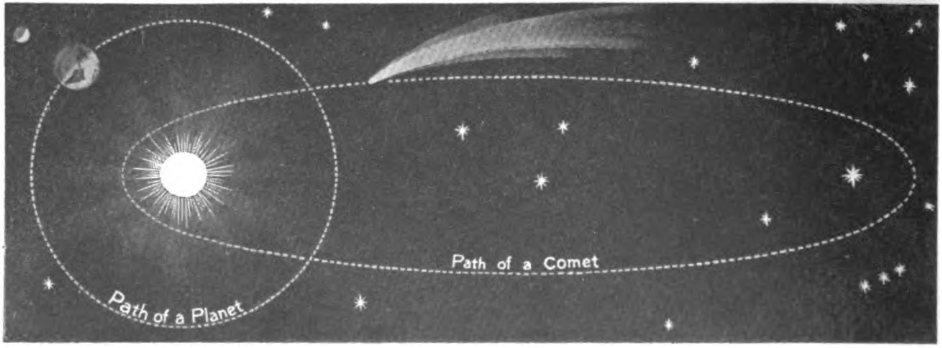
A very interesting fact is that a famous comet, the path of which was well known, disappeared some time ago, and just in that same path we now know that there are a number of these small bodies like pebbles. There can be little doubt that they are the remains of the broken comet.

Now we have completed the strange list of the different kinds of things that make up the solar system : Sol, the sun himself, in the centre, the planets round him, the moons of the planets going round them, the very small planets found between Mars and Jupiter, the comets, and a host of little things like pebbles. All these make up one great family ruled by the sun. So far as we can find out, they practically all move in the same direction round the sun; they twirl or twist on themselves as the earth does, also in that same direction; their moons go round them in that same direction, and even the sun himself is twisting in the same direction also.

This solar system, of which, of course, from our point of view, the most important parts are the sun and the earth, is very much alone, as we have said, in the great world. But it does not stay in one place. We know that the sun—and with him all the planets and moons—is moving through space at a great rate of about twelve miles per second. Though the solar system is very much alone in space now, we have no reason to think that it was always so, or that it will always be so.

The next story of the earth is on page 307.

THE LONG AND LONELY JOURNEY OF A COMET, WITH ITS TAIL MILLIONS OF MILES LONG



This picture shows the path of a comet round the sun. At one time the comet comes quite close to the sun, and just misses running into it; then, passing round the sun, it travels far beyond all the planets, millions of miles into space, until it comes to the sun again. The circle shows how the earth goes round the sun, and it is when a comet comes close to the earth's path that we see it.

WHY CAN'T WE SEE IN THE DARK?

CONTINUED FROM 91

"The dark" is the absence of light. Now, what is the name for the absence of sound? What do we call the state of things when we hear no sound? You know very well that the answer is silence. Let us remember after this always to think of darkness and silence as if they were a pair of things. Darkness is the absence of light, and silence is the absence of sound.

But there is more to say. There may be a wave motion in the ether, but it is hardly proper to call that light until someone sees it. There may be a wave movement in the air, but it is hardly proper to call that sound unless someone hears it.

Seeing and hearing, then, depend, first of all, on there being something outside of us—a particular kind of wave; and, secondly, on our being able to feel that something. In order to see, it must be there.

That is why we cannot see in the dark—because there is no light, and it is only light that we see. But, also, the seeing eye is necessary. A table in a dark room is there, though we cannot see it. There is no light, and so we see nothing. When we *do* "see the table," as we say, we really see the light coming from it, and the form of the light tells us the table is there. A blind man cannot see, even in the light. The great English poet, Milton, in his poem on Samson, makes Samson say, when he had lost his sight:

> "Oh, dark, dark, dark amid the
> blaze of noon!"

That famous line will help us to understand what darkness may depend on—either the absence of light, or the absence of the power to see light.

WHY CAN TIGERS AND CATS SEE IN THE DARK?

We must know that nobody at all can see if it is perfectly dark—that is to say, if there is no light at all coming from anywhere; but when we usually speak of being in the dark, we mean that there is so little light that we see hardly anything.

That is because our eyes are so made that they cannot alter themselves to suit the conditions of very dim light; but some animals can make the pupil of the eye so wide as to get the benefit of whatever rays of light are about. This is the case with cats, and if you watch the cat's eye when it is in the dark, you will see that the pupil appears much enlarged. This allows all the light possible to enter the eye, and the cat, and other animals that have eyes like it, are able to see very much better in dim light than you or I can.

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WHAT IS QUICKSILVER?

Quicksilver is a very good and expressive name for one of the elements. Now, silver is an element, and quicksilver is not silver, but it has a silvery appearance. When we say quick nowadays we think simply of something moving, but the real meaning of quick is alive, and quicksilver really means live silver. It is so called because it seems to move almost of itself. One of the Roman names for it was "living silver," which is exactly the same as our popular name for it. The strict chemical name for it means water-silver, but the name by which it is generally known is *mercury*, which was the name the Greeks gave to the messenger of the gods. We have said that quicksilver, or mercury, is an element, and we know now what that means. It is not a kind of silver, nor a mixture of water and silver, nor anything else but itself. It belongs to the group of the metals, like gold and silver, lead, iron, and so on, but it is unlike all other metals in being liquid at ordinary temperatures. Of course, other metals, gold and iron and what not, can be made liquid, but that is only when they are intensely hot. That is all we need say about mercury now, except that it is very heavy, so that even iron and lead, heavy though they be, can float upon it.

WHY DOES QUICKSILVER RUN AWAY WHEN WE TOUCH IT?

These questions have been asked and wondered about ever since mercury, or quicksilver, was discovered, more than 2,000 years ago. There is no other element, and no compound, which behaves in the same curious way as mercury—which almost seems alive. The reason is that here we have something which is liquid, and has the properties of a liquid, yet is exceedingly heavy, while the tiny particles of it have a very great attraction for each other. The reason we cannot pick up quicksilver is that it is a liquid. We should not expect to be able to pick it up any more than to pick up water, only it looks so different from any other liquid we know that we can scarcely believe it is a liquid, and so we expect to be able to pick it up. Being a liquid, it runs, as water runs, and that is what happens when it is touched. We can only begin to understand the curious way in which mercury behaves if we first remember that it is a liquid, and that it must do what other liquids do.

WHY DOES QUICKSILVER ROLL UP INTO LITTLE BALLS?

The special peculiarity of mercury as compared with any other liquid is that the atoms of which it is made have a very powerful attraction for each other. We see this same attraction when water forms in drops, but while water will form in drops on some surfaces, it will not on others. If we put a drop of water on a piece of blotting-paper, the attraction of the surface of the paper for the atoms of water is greater than their attraction for each other, and so the drop of water is broken up, and the water wets the paper. But though a drop of mercury is a true liquid, just like a drop of water, it will not wet the paper. Even if it is split up it simply splits up into smaller balls or drops. This is because the atoms of the mercury have a very much greater attraction for each other than they have for the surface of the paper, so they keep to themselves, and, as they are all pulling towards each other, they naturally make round balls.

WHY DO WE NOT SEE OUR BREATH ON A WARM DAY?

We know that our breath is warmer than the air outside; but though the breath coming out of our bodies is always of very much the same temperature of hotness, the air outside varies very much. Sometimes the air outside is so warm that it does nothing in particular to that gaseous water—or water in the form of a gas—which is always in our breath; and so we see nothing. But on a cold day this gaseous water, as it leaves our bodies, is suddenly turned so cold that it forms a little cloud, made, like other clouds, of drops of water. That is what we see when we say that we see our breath. It is the water in our breath that has been turned liquid by the cold. There is just as much water in our breath on a warm day, but then it remains in the form of a gas as it comes from our bodies. But if we take a piece of cold glass, even on a warm day, and breathe on it, we get a little cloud of water forming on the glass, and that is "seeing your breath."

WHY DOES A DUCK NEVER GET WET?

There are really several reasons. For one thing, the plumage or the feathers which cover the body of the duck are very thick and very smooth. The feathers are so thick that the water on which the duck is floating does not come in contact with the air underneath the feathers, so that the skin of the duck is kept quite dry and quite warm.

But this would not be enough by itself. There is a structure called a gland, which has an opening on the back of the duck near the tail. The business of this gland is to make oil, or grease, and quite a lot of oil is produced from it. This oil is used by the duck to smear over its feathers to make them extremely smooth and slippery, just as oil is used to lubricate a bicycle. Now, it is a very curious thing that oil and water will not mix, and so the duck—like any other bird which lives in the water—having covered its feathers with a thin layer of this oil, prevents the water from wetting the feathers, and so keeps its skin and feathers dry. Thus, as a matter of fact, the water does not affect the duck at all, and this gives rise to a common saying. If anything happens to a person, and that person takes no notice of it, it is said he is like a duck, because he is no more affected than the duck is by the water on its back.

WHY DOES A GLOW-WORM GLOW?

A glow-worm is not a worm at all, but is the female of a kind of beetle seen during the summer months up to the close of August, on warm banks and hedgerows and in woods and pastures. As soon as the evening's dusk begins, this beautiful insect begins to show a most exquisite yellowish-green light, caused by what are called luminous organs placed over the tail end. The object of this light is not very certain, but most of the wise men who study living creatures suppose that the female shows the light for the purpose of attracting the males, which do not shine in this way. Whether this is the real reason or not we cannot be quite sure, but the glow-worm is only one of many animals which show light by means of what is called phosphorescence.

WHY DO WORMS OR FROGS SWARM ON A COUNTRY ROAD AFTER A STORM?

Frogs are what are called amphibious animals—that is to say, they live part of their lives on the water, and part of their lives on the land—but they are never very active unless there is a good deal of moisture to be had. In fact, when the ground gets dried up, and it gets very hot, the frogs disappear down crevices into the dampest and coolest corners they can find, and as long as the nice dry weather lasts one does not come across many frogs in their country walks; but if there is a spell of wet weather, such as the frog delights in, he may be seen jumping about over the wet grass, and the wetter it is the better he likes it. His activity, like that of many other animals, is directed chiefly to the search for food, and it so happens that the particular kind of food the frog likes is also more abundant in wet weather. As a matter of fact, although the young frog or tadpole lives on vegetables, the adult frog lives on insects and worms and such small animals, which, however, must be moving about if they are to excite his interest. As this happens generally after a storm, so we see the frogs especially at that time.

WHERE ARE A FROG'S EARS?

One might well ask where the ears are, when we cannot see them. But we must remember that an ear is simply something by means of which the animal can hear, and not necessarily anything that we can see. As a matter of fact, what we call ears are merely outside flaps of skin which, when they are large, serve the purpose of collecting the sounds in the air around. The real hearing is all done inside the skull, and in the case of the frogs, as in the case of birds and lizards, there is a little hole some distance behind each eye, and not far from the angle of the mouth. The frog is entirely without any outside ear at all. Inside this hole is the internal ear, and in the frog there is a middle ear, too, for the purpose of conducting the sound to a special nerve, which takes it to the brain, where the real hearing is done.

HOW DOES A PEACOCK KNOW WHEN IT IS GOING TO RAIN?

It is not very easy to say what any animal does know and what it does not know. But if it is true that the peacock can tell when there is going to be wet weather, we can only say that knowledge of that kind possessed by an animal is due to what we have learned to call instinct. Of course, you know that all birds, except those which live partly in the water, have a great dislike for getting their feathers wet; and in the case of the peacock, which has such a gorgeous array of plumage, it is quite obvious that a severe wetting would be most disagreeable. A peacock wet through would be a pitiable sight. Now, the more important it is for an animal to be spared disagreeable experiences, the more we find that the instinct to avoid them is present in the animal; and so in a bird like the peacock, which has a great display of fine feathers, the instinct to foretell wet weather has been highly developed.

WHY ARE SOME PEOPLE COLOUR-BLIND?

We must understand that colour is caused by waves of light of different lengths, which can be taken up by certain structures in the eye, just as sound is caused by other waves taken up by the structures of the ear. Now, in that part of the eye which we call the retina, certain parts can be affected only by *slow* waves of light, which cause a *red* colour; other parts only by medium waves of light, which cause a *green* or *yellow* colour; while still other parts are affected by the *fastest* waves of all, which give us the idea of *blue* and *violet*. In people who are what we call colour-blind, there is some defect in these structures in the retina, so that certain definite waves are not appreciated by the eye, but only other waves. This means that some colours only may be seen, and such a person, therefore, is very apt to call a green thing red, and so on, because they can only see red waves, not the green ones.

WHY HAVE WE FINGER-NAILS?

We must always remember, when we ask what is the use of some part of our bodies, that all the higher animals are made on the same plan, and what is not of much use to one animal may be extremely useful to another. Now, you may think that our finger and toe nails are not of much use to us, but it is easy to see that they are very useful to those animals which have to scratch in earth or in sand, or have to defend themselves with their claws, which are their nails.

But finger-nails have a great use even for us, because by means of them our finger-tips are made very much firmer, and in that way we can grasp objects better. They also enable us to pick up small objects much more easily than we could without them. Finger-nails are really parts of the horny part of the skin, modified in a special way.

WHAT IS THE USE OF OUR HAIR?

Here again, as with finger-nails, is a part of our bodies which does not seem of any very great use to us, but which is very important to animals. Hair is Nature's way of protecting the body from cold and wet, and so we find that dwellers in coldest climes have a good deal of hair, especially in the case of savages. If we look at pictures of very ancient times, we see that the people are represented as being very hairy; and, indeed, it must have been very important to them to be protected in this way in the days before clothes were made. Nowadays, in what we call civilised countries, we wear such a lot of different kinds of clothes that it does not matter to us whether we are hairy or not. If you remember that hair, wool, fur, and bristles are all the same structure, you will realise that to most animals their hair is very useful.

WHAT IS IT THAT MAKES US HUNGRY?

We have had many questions about animals which we have answered by saying that animals know things by *instinct*, and now we come to one or two questions about human beings which *we* know very much in the same way. No one needs to tell us when we are hungry. We know quite well without being told. It is one of the few instincts that human beings have. Even a baby knows when it is hungry. It is a fortunate thing that the cells of which our bodies are made have this power of making their wants known to us. As soon as there is too little food in the body, it means that the blood has not enough nourishment in it. There is a sinking feeling in the pit of the stomach, and it is this feeling which we call hunger. This is one of the few things that a human being knows without having to learn it.

WHY ARE SOME PEOPLE DARK AND SOME FAIR?

If we examine with a microscope the structure of the skin in animals or human beings, we find that it is made up of numbers of cells arranged in layers. Among these cells are found colouring matters, or pigments, as the artists call them; and it is the quantity of this colouring matter present in any individual which causes the complexion to be called fair or dark. In very fair people there is very little pigment. In very dark people, with brown eyes and black hair, there is a great deal of pigment; while others with not very much pigment are neither very fair nor very dark. This pigment goes on being produced for many years; but when it ceases, the hair becomes grey, because it is no longer coloured. We see this usually in dark people.

WHAT MAKES PEOPLE WALK IN THEIR SLEEP?

There are two parts of our mind which control all our movements and actions. One part has to do with all those things which *we know we are doing;* while the other part does things *without our knowing* anything about it.

If we come to think of it, we do quite a lot of things without being very conscious of them. For instance, we do not think about breathing, although we are always doing it. We do not think about our heart beating, although it never stops as long as we live, and there are some things which we can learn to do so well as to be able to do them without thinking at all. Walking is one of these things. When we were little babies we could not walk. Gradually, however, we learned to walk, and in time we got so accustomed to walk as to be able to move about quite well without any great effort of mind. Now, acts of this kind are sometimes done by people in their sleep, and they can do them just as well asleep as awake, because the mind has got so used to looking after such acts that it does not require the person to be conscious when doing these things.

So some people are found to walk in their sleep. This is really because one part of the mind is wide awake when the other is asleep. The curious thing about walking in sleep is that, just because the walker is asleep and not conscious, he can walk over dangerous spots which would probably cause him to fall, through nervousness, if he were wide awake. But as he is not awake, and not conscious, he generally walks safely, and remembers nothing about it.

WHY DO NOT SOLDIERS WEAR ARMOUR NOW WHEN THEY GO TO WAR?

Soldiers do not wear armour in these days because they can fight better without it. Even if they wore it, the armour would hardly protect them as it protected men long ago, because bullets now can pierce armour as easily as a stone pierces a window. Men wore armour long ago because guns had not then been made. Then men fought with swords and spears and arrows and battle-axes. Against these, good armour would protect a man. It was almost impossible to kill an armoured knight in battle. He wore a steel helmet and a steel coat; his legs and feet were encased in steel. The front part of his helmet could be raised, but on going into battle he lowered this, and was completely protected. If by any chance he did not lower this vizor, as it was called, there was a danger of his having an arrow or a spear thrust into his eye.

The common soldiers did not have complete armour like the knight's armour, so they were killed. What the knight feared was that he would be stunned by a blow on the head from a battle-axe, and be taken prisoner. If that happened, he might be killed after he had fallen, and so he used to wear a rich, flowing robe over his armour, to show that he was a man of wealth who could pay ransom if his life were spared.

But when gunpowder was used to fire bullets, the armoured knight and the unprotected soldier were placed upon the same footing—a bullet would kill either of them. So the use of armour was abandoned. The battle chargers of which we read were great cart-horses; when armour was abandoned, swifter, lighter horses were used, so that cavalry could move more quickly, while foot-soldiers could march farther and faster.

WHAT GIVES US EARACHE?

Headache and earache and toothache are caused by a great number of different things, most of which act upon some special nerves, or upon some part of the brain, causing a change in these structures which gives rise to a feeling of more or less intense pain. Sometimes the nerve swells up, and if it is in a tight place, like the nerve of a tooth, there is no room for it to swell very much, and the result is that the pain is very severe.

WHY IS A ROAD HIGHER IN THE MIDDLE THAN AT THE SIDES?

If a road were not made higher in the middle than at the sides the rain would not drain away into the gutters, but would lie in puddles all over the road, splashing everything and everybody that passed. But the road is not so high in the middle as you may think. Suppose the road is 72 feet wide, the centre of it will be only six inches higher than the sides. That is the way in which the perfect road is constructed. If a road has too great a slope, it is bad for traffic; it causes all the horses and carts to be kept in the centre, and so ruts are worn and the road destroyed by the unequal wear and tear which one line of route has to bear.

The Romans made magnificent highways. Some of them are still good after 2,000 years of traffic. But after the Romans left England their fine roads were neglected. They were never repaired; they became overgrown with weeds. The parts of the country which they had not paved had no proper roads, but only horse-tracks, which were so boggy and bad that they could not be used in winter. In the thirteenth century a law had to be passed compelling the people to cut down all trees and shrubs for a distance of 200 feet from all roads running between market towns, so that robbers should not hide and waylay travellers.

WHO MADE GREAT ROADS?

The man who made splendid roads was John Loudon McAdam, who was born at Ayr, in September, 1756, and died in Dumfriesshire, in November, 1836. He spent his youth in America, where he became rich; but on returning to Scotland he gave much of his time to experiments with roads.

After many trials he found that the best roads were to be made of thin layers of broken hard stones, all, as far as possible, of the same size, and none weighing more than six ounces. He was appointed to provide food for the warships at Falmouth, but while there he continued his experiments in road-making at his own cost, and he was appointed to look after the roads about Bristol. His roads were now talked about, and though he had many enemies who did not believe in his work, Parliament examined his plans, and decided that they were good. McAdam's generous work for other people made him quite poor. He travelled over 30,000 miles of roads in Great Britain in pursuit of his investigations, and had spent out of his own pocket over $25,000. Parliament presented him with $50,000 and thanked him for his work.

It was due to him that the splendid roads about England and all over Europe were made. Until the railways were built, his roads were the only paths by which commerce could travel on land. And now, when we hear of a macadamised road, let us remember the man after whom it is named.

WHERE DO BATS GO IN THE DAYTIME?

Bats are nocturnal creatures. That is to say, they sleep during the day and are active at night. So are many other animals. Nearly all the wild deer are, and the lions and tigers and leopards. These larger creatures can see by day, but the bats cannot. They are as blind in the sunlight as a dormouse. Therefore, as they would be helpless if a cat or a big bird were to see them by day, they hide away in dark places. In all the church towers, in corners and underground passages, in little openings under the roofs of houses—there the bats hang by day.

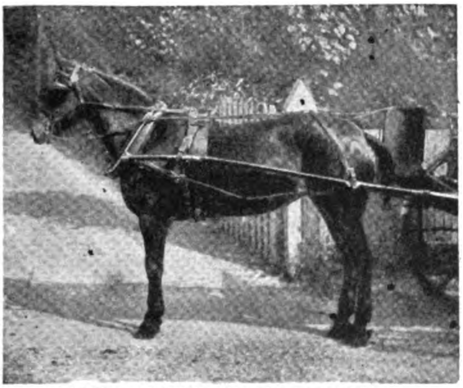
There is an enormous cave in Kentucky in which millions of bats are to be found, sheltering while the sun is shining. They cling to the rock and to each other in such thick clusters that forty bats were once counted in a space of a few inches. The Egyptian Pyramids swarm with bats. Inside all is dark as the darkest night, even on the brightest day, and travellers are astonished to find bats dashing about their heads. Dazzled and frightened by the candles, they fly about in great alarm and beat against the face, as a moth beats against the globe of the lighted gas. Some plants are like the bats—they sleep by day and open and blossom by night. Even the beautiful lily gives off its richest scent when midnight is at hand.

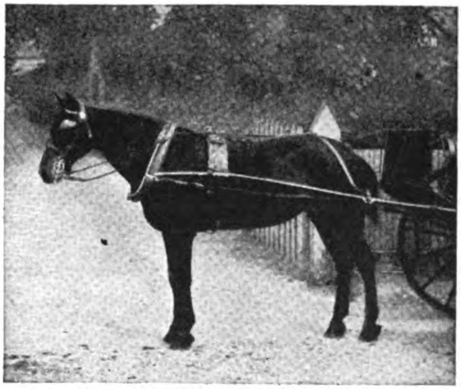
IS IT CRUEL TO USE A CHECK-REIN?

If, when setting out for a long walk, you had a piece of steel fixed in your mouth and straps attached to it so that your head was fastened, preventing you from moving it, you would understand at once why it is cruel to use the check-rein. A check-rein is not the pair of reins with which we drive; it has nothing to do with driving. It is a short rein tightly hooked on to that part of the harness called the saddle, and its sole purpose is to make the horse arch its neck and "look proud."

Fancy thinking that a horse looks proud when you can see it is in such misery that it cannot be still when standing, or run freely when moving!

Some horses have naturally arched necks; others have not. It is the nature of a horse, when drawing a load, to stretch out its neck. This gives it more power to pull the weight behind it. By using the cruel check-rein men deprive the poor animal of free motion, and make its work doubly hard. All the time it is tugging and straining to get its head free, but the cruel rein pulls the bit, hurts the horse's mouth, and keeps its neck arched and confined, and, after its owner has enjoyed a beautiful drive, the tortured animal returns to its stable foaming from its exertions under cruel conditions.


THE CRUEL MAN'S HORSE
This horse has a check-rein. When you see a **horse like this, it is in pain, and is being cruelly treated.**


THE GENTLE MAN'S HORSE
This horse has no check-rein. A horse like this, whose reins are free, can move easily and naturally.

WHY DO PEOPLE USE THE CHECK-REIN?

Poor people who have to groom and feed their horses, and so understand them, do not use the check-rein. Thoughtless people and snobs use it. Sometimes people let their coachmen decide for them, and if the coachman is ignorant and stupid, thinking only about "looks" and nothing about a horse's feelings, he may use the check-rein.

The snobs use the check-rein to make their horses appear prancing, arched-necked, spirited steeds of great value, whereas, perhaps, so far as money goes, they are worth next to nothing. There are proper ways and means of making all horses, good or bad, look well—by feeding and grooming. But torture is not one of the ways, and whenever you see a horse with a check-rein you may know at once that its owner is either thoughtless, or cruel, or a snob, or a brute. And a horse with a check-rein, when it tosses its head and paws the ground and foams at the mouth, is not showing spirit; it is showing that it is in agony.

HOW DOES IVY CLING TO THE WALL?

The ivy is a plant which has the climbing habit. It has not strong branches which can stand by themselves, and so, if it is to spread out its leaves to the air and to the sun, it must hold on to something. There are thousands of plants which do this instead of forming stout branches as trees do. Some of them climb by thorns; the thorns of the rose, for instance, are made for climbing. Some of them hold on in other ways, as the ivy does, for it has no thorns. The creepers that hold on the best have actual little suckers, which give them a splendid hold of even quite a smooth wall. Ivy holds on mainly by taking advantage of little irregularities in the surface. If a wall is well built, ivy prolongs its existence by protecting it from the weather; but if a wall is very badly built, ivy does it injury by creeping in between the bricks. So it is best to build a wall well, so that we can make it beautiful with ivy, and preserve it by the same means.

WHY DOES A MATCH GO OUT WHEN WE BLOW IT?

When a match or a fire burns, it makes a certain amount of heat. Now, it needs heat in order that it shall burn at all, and that is why we have to put a match to a fire. Once it has started burning it will keep itself hot enough to go on burning as long as there is stuff to burn and air to burn it with.

Now, we can blow a match out because we blow away the heat in the hot gases which are just going to burn, and the whole thing becomes so cold that it will burn no longer, any more than the match would before it was struck. Any fire, the heat of which is in the gases it makes, can be blown out in the same way if we have a big enough wind to do it You must have seen the wind blow out a fire at a picnic. But the wind cannot blow out a coal fire, because much of the heat which keeps the fire going is in the glowing coal itself, and the wind cannot blow that away. We can make a match burn more quickly by blowing on it gently enough, so as not to blow its heat away altogether, but so as to keep up a brisker supply of air than if we were not blowing at all.

WHY DOES THE TEA RISE TO THE TOP OF A LUMP OF SUGAR DIPPED IN IT?

This question really has to do with the same subject as the last. Water, and watery things like tea, behave in just the opposite way to quicksilver. When they get a surface on which they can spread themselves, they do so, but quicksilver keeps to itself. You would not get quicksilver to run up into a lump of sugar. We must think of the sugar as if it were a lot of little tubes all put together, and then it is easy to show, by a simple experiment, what happens.

If we take a thin glass tube and dip it into water, the water will spread itself out on the inside surface of the tube, and will rise a little higher in the tube than outside, and where the water stops it will have a cup-shaped surface, because the water all round, where it is next the glass, creeps up the glass a little. It is just this that happens when tea runs up a lump of sugar.

But mercury acts in exactly the opposite way; it is not attracted by a surface, but pushed back, and the picture shows the difference between the case of water and the case of mercury when a thin tube is pushed in to them. The picture shows that the mercury is pushed back by the tube, and that the surface of the mercury is shaped like a cup upside down, because all round the edge of it it holds itself back from the glass, just in the opposite way to the water, which creeps up the glass.

DO ANIMALS KNOW WHEN THEY ARE BEING TREATED KINDLY?

Not even the wisest man can tell you how much animals know and how much they do not know, and it is still more difficult to say how much they can appreciate; but what we do know is that all the animals that man makes use of, or lives much with, can feel pain very readily, and are capable of great suffering. Whether they know they are feeling it is a different matter, much too deep a question for us here. But the most important point about this subject is this—that whether animals appreciate kindness intelligently or not, it makes a very great difference to the human being who treats his animals well. No one who is cruel or unkind to animals will be kind to his fellow-creatures, and therefore we should always try to treat animals as kindly as one of ourselves, so that we may grow kind to all living things.

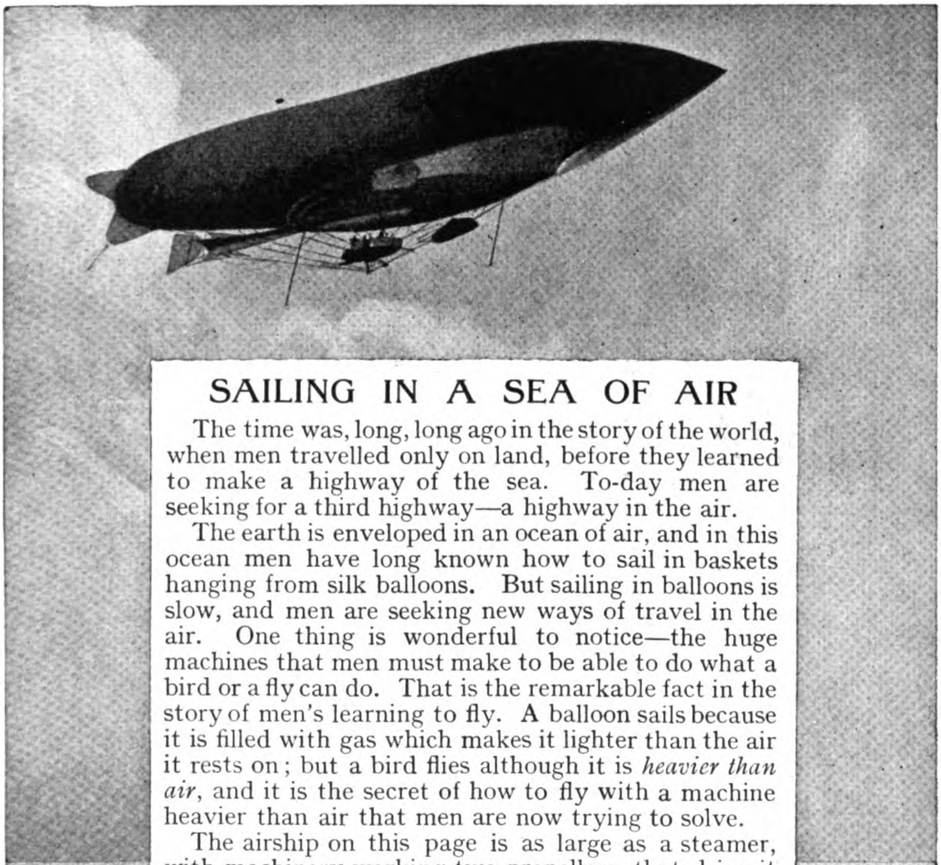
CAN A POISONOUS SNAKE BITE IF IT LIKES, WITHOUT POISONING?

Some can and some cannot. The way that poisonous snakes use their fangs to inject poison is one of the most wonderful things in Nature, and in the case of some of them—for instance, the common adder or viper, which lives all over Europe—this poison fang and its venom are only used as a means of self-defence, or for getting food.

But the adder as a rule does not use its poison fang when it bites the animals on which it feeds, and so it has a very curious arrangement, by means of which these fangs are laid flat back in the roof of the mouth out of the way of the ordinary teeth which are used for feeding. Thus the adder can use one or other sets of teeth just as it likes when it wishes to kill its foe, and it can tuck its fangs securely out of the way and use its ordinary teeth when it wishes to swallow a mouse. In some of the other poisonous snakes the fangs are fixed, and cannot be used in this way.

The next questions are on page 303.

HOW MEN ARE LEARNING TO FLY



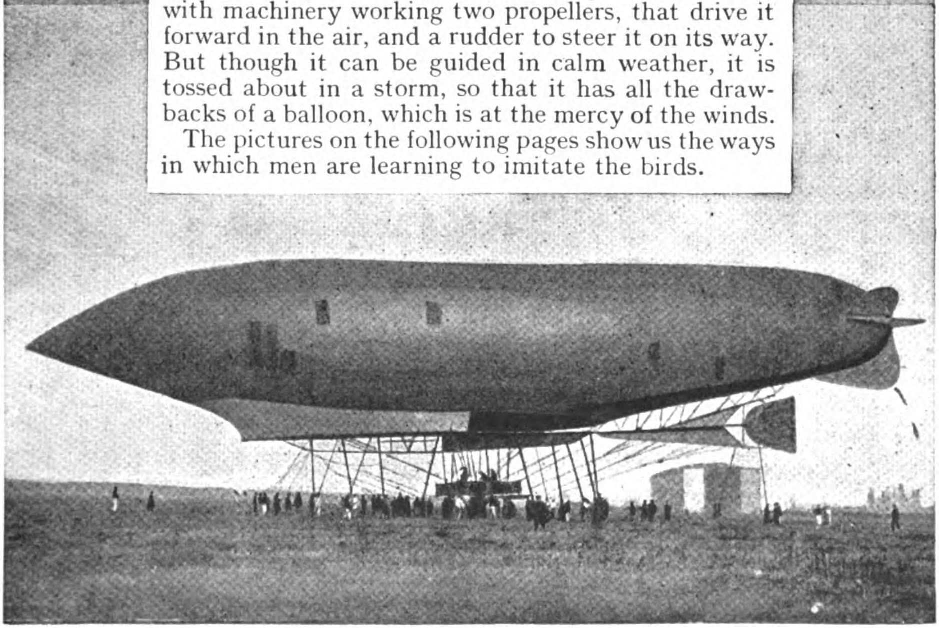
SAILING IN A SEA OF AIR

The time was, long, long ago in the story of the world, when men travelled only on land, before they learned to make a highway of the sea. To-day men are seeking for a third highway—a highway in the air.

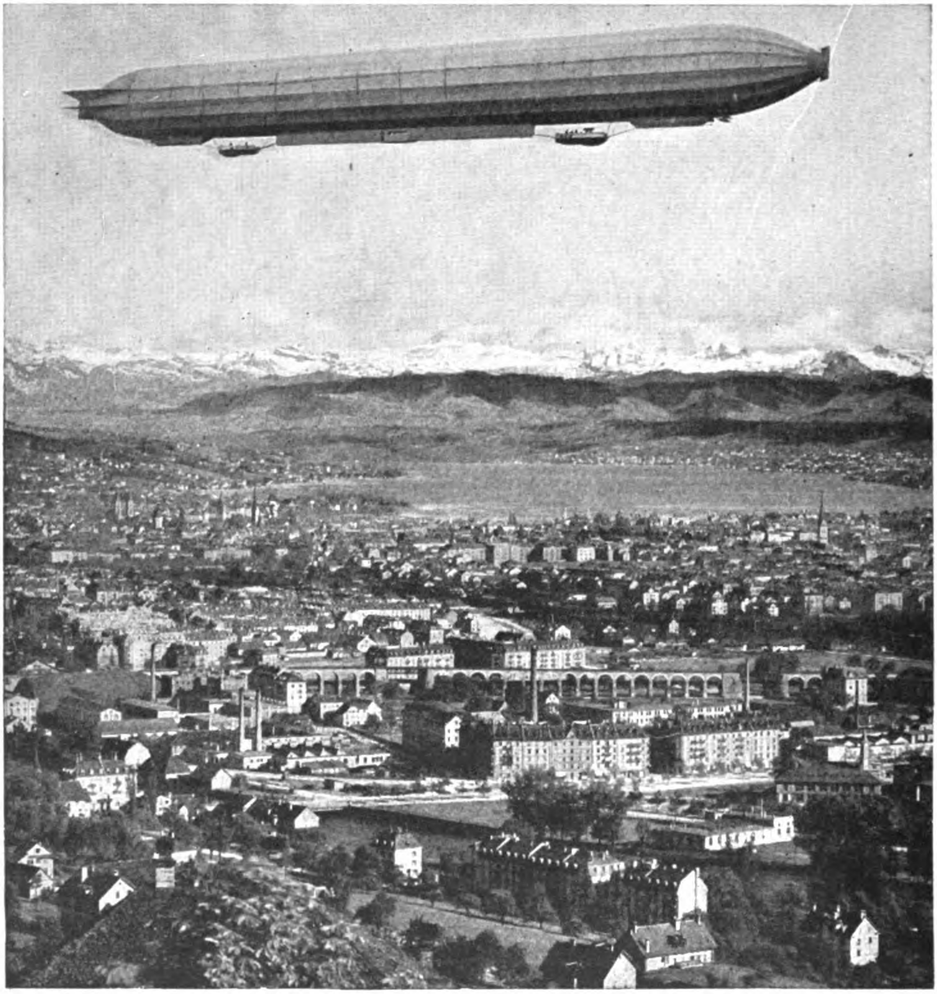
The earth is enveloped in an ocean of air, and in this ocean men have long known how to sail in baskets hanging from silk balloons. But sailing in balloons is slow, and men are seeking new ways of travel in the air. One thing is wonderful to notice—the huge machines that men must make to be able to do what a bird or a fly can do. That is the remarkable fact in the story of men's learning to fly. A balloon sails because it is filled with gas which makes it lighter than the air it rests on; but a bird flies although it is *heavier than air*, and it is the secret of how to fly with a machine heavier than air that men are now trying to solve.

The airship on this page is as large as a steamer, with machinery working two propellers, that drive it forward in the air, and a rudder to steer it on its way. But though it can be guided in calm weather, it is tossed about in a storm, so that it has all the drawbacks of a balloon, which is at the mercy of the winds.

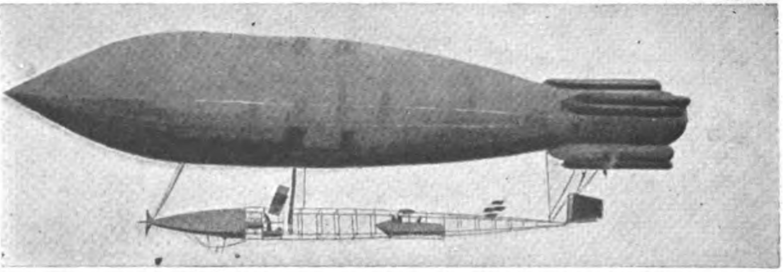
The pictures on the following pages show us the ways in which men are learning to imitate the birds.



THE MAN WHO SAILED ACROSS THE ALPS



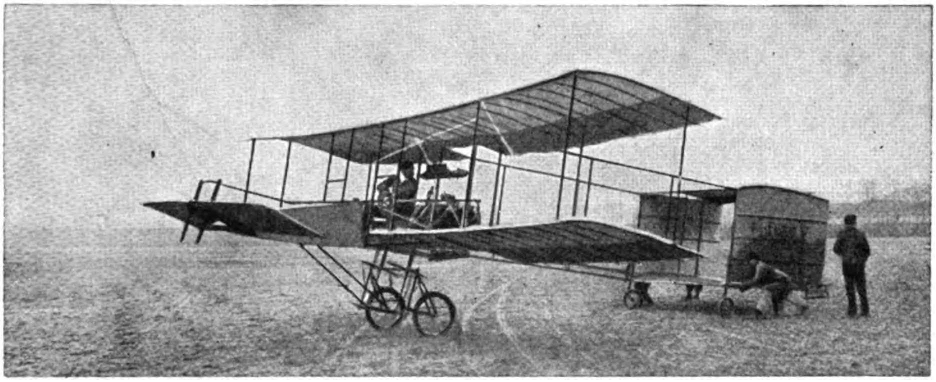
Here we see the largest steerable balloon ever built. If placed with one end on the ground in Madison Sq.,N.Y. its other end would be nearly two-thirds the height of the Metropolitan Tower, and yet it could carry only some twelve people. A steamer of the same length could carry over 1,000 passengers. This shows what a clumsy thing the balloon is. The vast cylinder which we see here, hovering over the town of Zürich, is filled up inside with about twenty balloons, each full of gas, and all to hold up two little cars. This airship made a long voyage from the Lake of Constance across Switzerland, and was destroyed by accident. It belonged to Count Zeppelin.



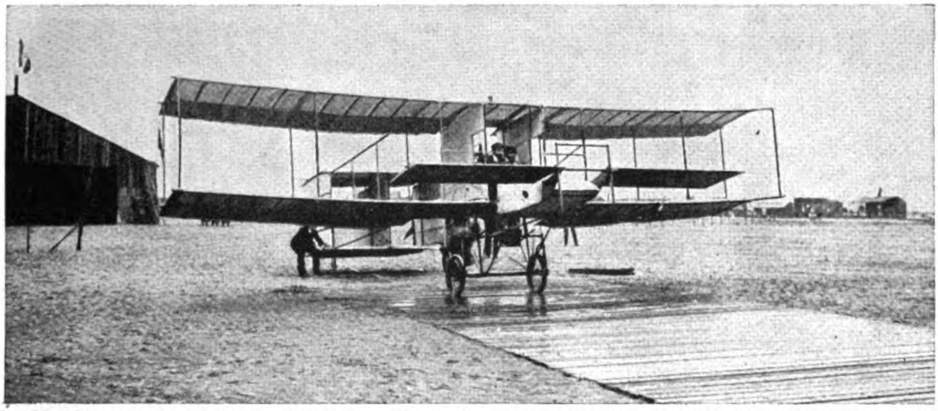
In this great French steerable balloon the propeller is not at the back, but at the nose of the car, and instead of pushing the balloon forward, it has the effect of pulling it. This airship has, of course, the same fault as all those of the class to which it belongs, for it is impossible to control so great and light a body against strong winds. While these balloons are helping men to learn how to navigate the air, it is not likely to be by these that men will ever be able to do what a bird can do. The successful machine will be more like a bird.

The photographs on these pages are by the Illustrations Bureau, Rol & Co., and others.

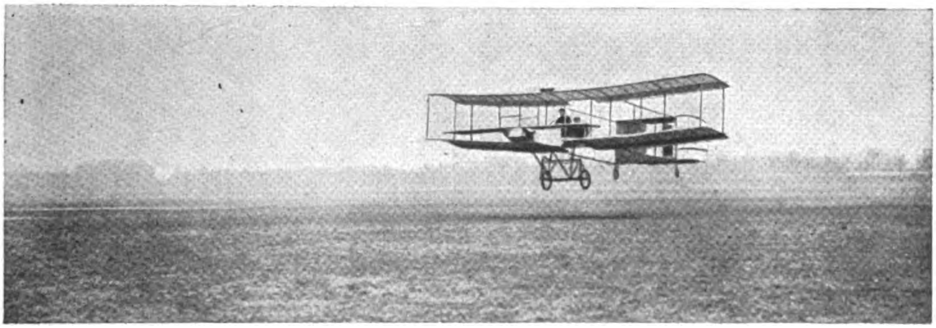
A MACHINE THAT FLIES IN THE AIR



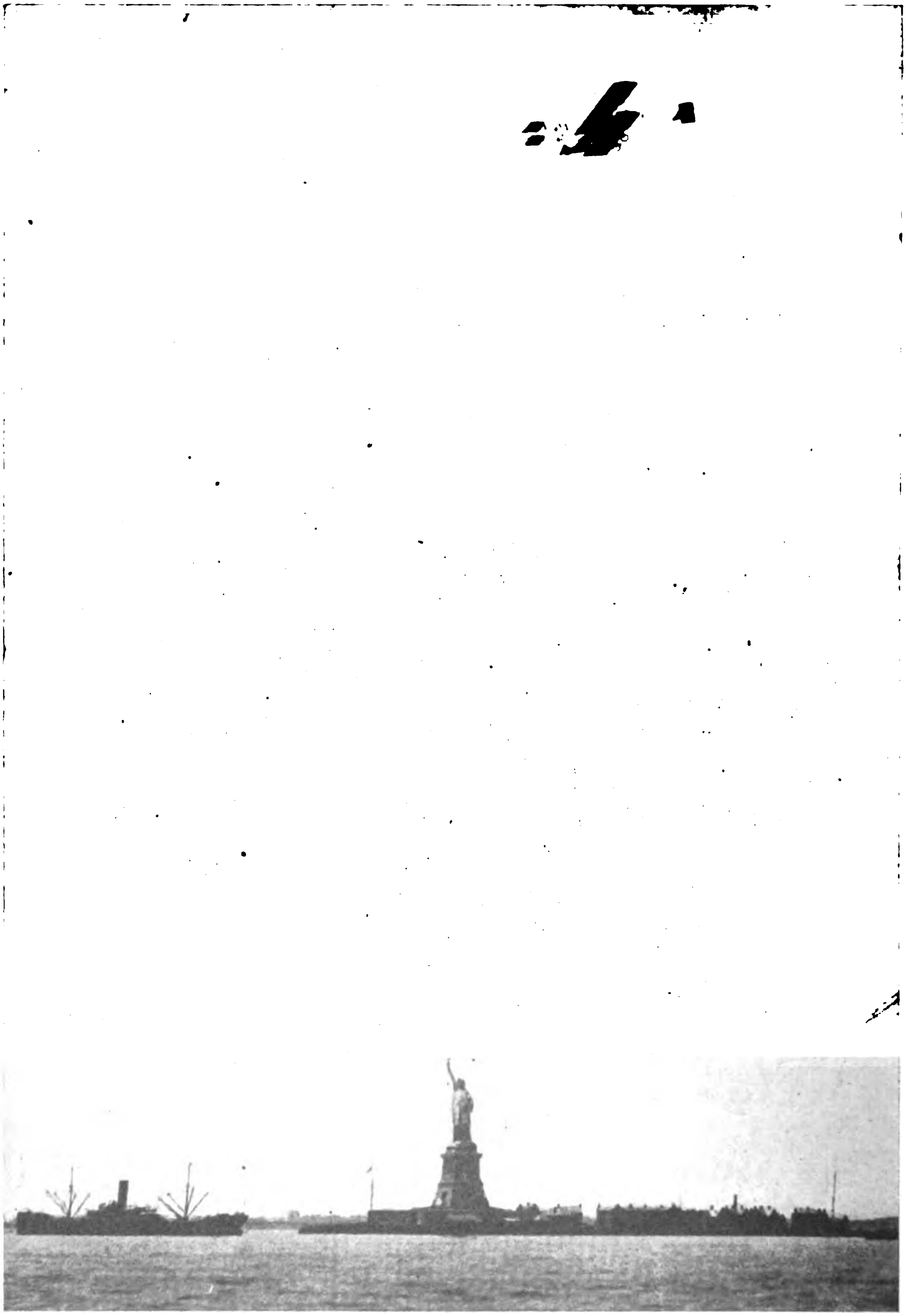
A bird raises itself in the air by spreading out its wings and beating downward. A boy's kite also is heavier than air, yet it can rise a great way if the boy knows how to work it. It rises against the wind by being inclined at an angle, so that the wind, blowing on the face of the kite, forces it up, and the boy, by pulling the string, can make it move forward against the wind. This is what men are doing with what are called aeroplanes. In the aeroplane shown here we see two long spreads of canvas strapped tightly over strong ribs. These are like the wings of a bird, or like the boy's kite. In front there is another arrangement of canvas which can tilt up or down. Behind, looking like a little canvas house, is the rudder of the machine



In this picture we see the same machine standing on its wheels, with the aeroplanes set, so that the wind will press against them, just as the wind presses against the kite. There are two men sitting in it, and when they start the machinery the aeroplane moves forward on its wheels, and the action of the wind in a very little while forces it into the air. It flies through the air exactly as a kite flies, except that, instead of a boy pulling a string in front, there is an engine forcing the car forward from behind. Its wings are set to catch the wind.



The same machine is here seen in full flight, at no great distance above the earth, but flying splendidly all the same. And as the engineer sets his sails or wings he can raise or lower the machine at will; the more he tilts them upward for the wind to press against them, the higher he rises, while his course can be directed perfectly by the direction in which he turns the big tail of his machine. The aeroplane here illustrated was invented by Mr. Farman, an Englishman living in Paris, who has made many successful ascents in it.



On the morning of May 29, 1910, Mr. Glenn H. Curtis left Albany in an aeroplane of his own invention, and mounting several hundred feet into the air, flew down the Hudson River to Governor's Island, New York. He made two stops during his trip to fill the gasoline tank and look over his machine. Including the time lost in these two stops he made the trip in exactly three hours and twenty minutes, thus proving that an airship, although still in the very earliest stages of its development, is capable of equalling the speed of the fastest railway train in the world. Probably fifty years from now we will be flying all over the United States in airships, instead of going about in trains and boats.

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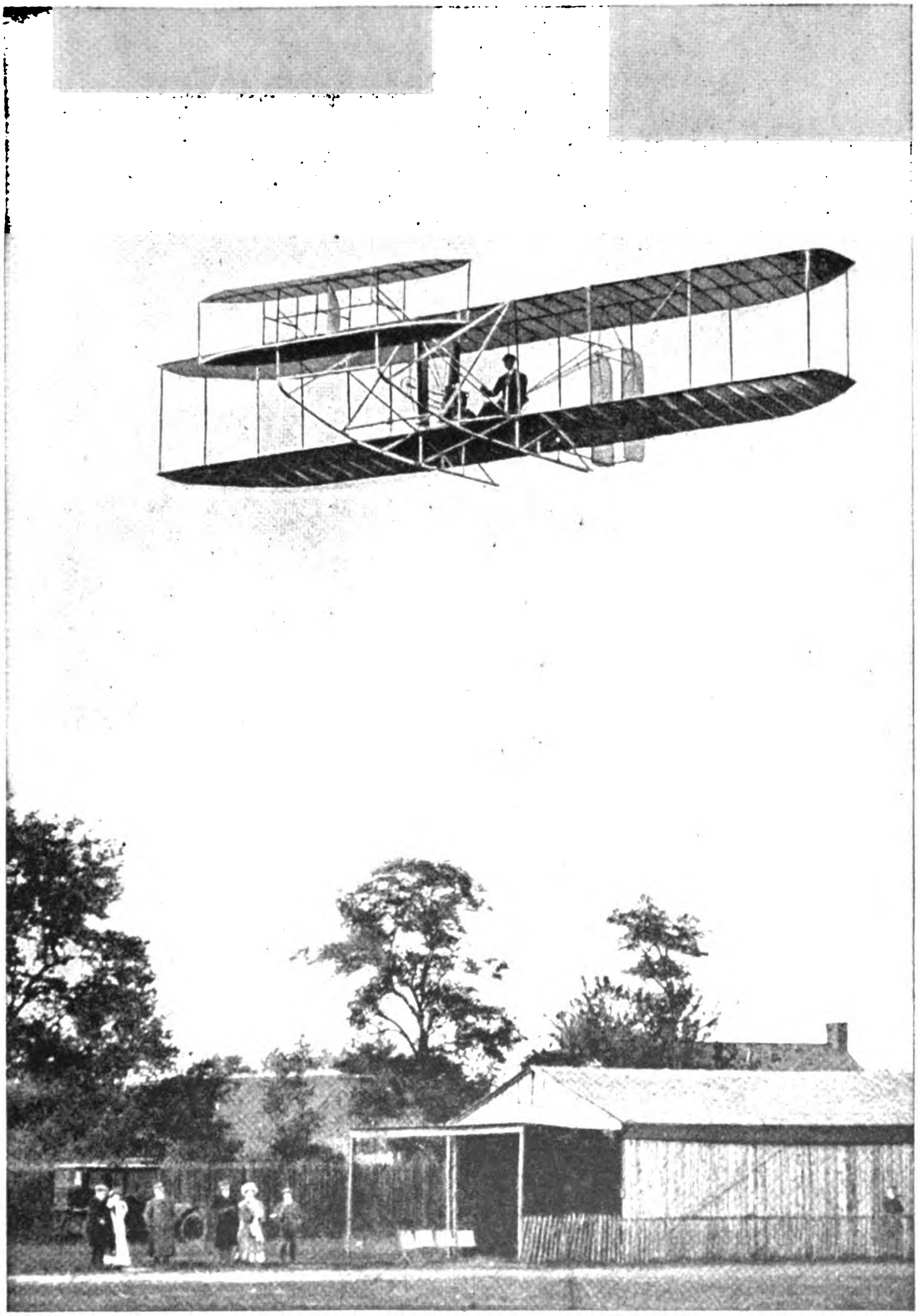
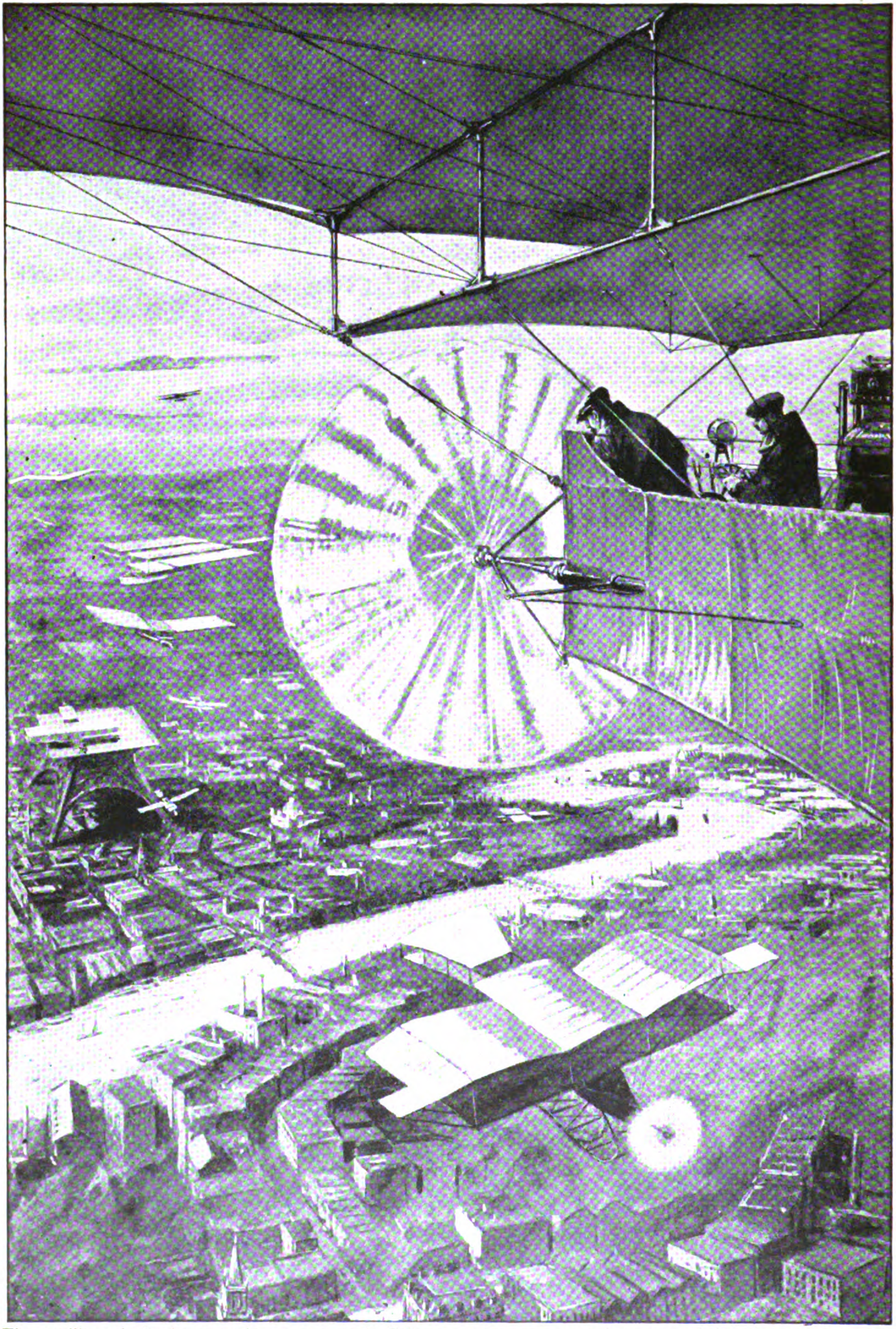
THE BEST AIRSHIP EVER MADE BY MAN



From the simple machine with which they began, the Wright brothers have developed this marvellous aeroplane, here seen sailing splendidly high above the trees. While it has been improved in some respects, the main idea is still the same. Instead of one aeroplane in front there are two, and the rudder is also double, while in the centre of the lower of the two great wings is a powerful little motor to force the machine forward. To go long journeys in an airship like this the rider need only clear the tops of tall trees or houses. This gives it a great advantage over a balloon, which must soar far higher, as it is difficult to keep a balloon at exactly the same height, even a slight change in the atmosphere from hot to cold immediately altering the level of the balloon.

WHEN MAN HAS CONQUERED THE AIR



There will, no doubt, be many improvements in flying machines once men have agreed that the aeroplanes are the best means of sailing in the air. The machines will, no doubt, be made smaller than at present, and all sorts of things will be done to enable them to carry as many passengers as possible, and to come easily to rest at stations. Large platforms will probably be erected as we see on the left of this picture, and beneath the airship long springs may be placed like those used on sledges, so that the great machines may fly up to their stations and drop slowly down on to the platform, where passengers will get out and descend to the ground by elevators.

The Child's Book of Its Own Life

WHAT THIS STORY TELLS US

We know that life is something more than liveliness, and that a thing may be alive even though we cannot see it move. We shall now try to find out how life began. Once upon a time there was no life on the earth, which was too hot for anything to live upon it. But as the world cooled, life began in the coolest part of it—that is, in the sea, and the first living thing, perhaps, was the seaweed. We are quite sure, at any rate, that the first living things were plants, because plants are the only things that know how to obtain food from air and water. Every living thing must have one thing to live upon—a kind of gas called oxygen, and plants feed on the oxygen, which they take in by breathing. Then the animals, and we ourselves, live upon the plants, and without plants not one of us could live. No man has ever been able to draw life straight from the air as the plants can do. We read here of the wonderful way in which plants breathe and live.

HOW LIFE BEGAN ON THE EARTH

CONTINUED FROM PAGE 64

We want to find out what it is that makes us call some things living and others not living; and we have agreed that our best plan is to look at the simplest kinds of living things, which are plants, and to learn from them. Another reason why we should do this is that in the story of life plants came first, and so we are beginning at the beginning.

All wise men are sure that there was a time when there was no life at all upon the earth—no animals, not even any plants, whether on the dry land or in the sea. Indeed, there could not then be any life, because the things that life needs were not to be found. Many wonderful things happen in a fire, but there is never any life in fire—it is too hot. And the dry land of the earth was once too hot for any life to be on it, just as a hot cinder is. As for the sea, it was also so hot as to be nearly boiling, and no life can exist in boiling water.

A little while before, the water that now makes the sea was so hot that it actually hung in the air in the form of what is called water vapour, and only when the hot earth became a little cooler did most of the water in the air turn liquid and fall in a great shower of the first rain that ever was into the low-lying parts of the earth's surface—the parts that we now call the bed of the sea.

Well, in all the sea, and in all the air, and on all the dry land, there was nothing that did what a plant can do—nothing alive. Then, at last, as men think, when the water far down in the sea became cool enough—cooler, of course, than the surface water upon which the hot sun shone all day—the first living things, the smallest and simplest kinds of plants, came to be. We need not ask ourselves exactly what those first plants were like, because all kinds of plants are really the same, and so it will do just as well if we take some kind of plant that we all know, and look at it. Grass will do very well, only we must think of it as living in water, like seaweed.

Now, grass, like all living things, plants and animals too, *breathes* and *feeds*, and *grows*—and dies. Wherever you had looked throughout the whole earth before the time we are speaking of, you would have found nothing that did these things—nothing *alive*. But when we find something that breathes, as you are breathing at this minute, and as I am breathing, and as every blade of grass on earth, every flower and fly and fish is breathing—then we know that it is alive. If it breathes it must feed; this feeding makes it grow when it is young; and at last it must die. These, then, when we find them, are the proofs of life.

And now let us look more closely at the life of the plant.

WHAT WOULD HAPPEN IF ALL THE PLANTS IN THE WORLD WERE KILLED

Of course, no plant, no tree or flower, can ever be so interesting, in itself, as an animal. Even a humble animal like the goldfish, which you may keep in a bowl of water in the drawing-room, or even a mere fly, has something about it that seems to make it more wonderful than the most splendid tree. It is all very well, for instance, to say that a cabbage is alive, but how very dull and stupid and half awake is that sort of *vegetable life*, compared with the animal life of even a lazy caterpillar that crawls over that leaf, and especially compared with a butterfly!

Now, I quite agree that animals show life in its most striking way, and that there is a great gap between the stupid, silent, rooted cabbage and the lark singing and soaring in the sky above it. And yet vegetable life was the first life, which had to exist before any animal life could be at all; and even to-day all the animal life in the world, including the life of our own bodies, entirely depends upon vegetable life. If all the plants in the world were killed, in a few short days every animal, every fish in the sea, and every man, woman, and child upon the earth would die also.

If animals can fly and jump and sing as plants cannot, yet plants can do wonderful things which animals cannot, things, indeed, which make it possible for animals to do all that they can do.

NO MAN CAN DO WHAT A BLADE OF GRASS CAN DO

The life of the plant is so wonderful in what it does that even to-day, after hundreds of years of thinking and studying and adding new knowledge to old knowledge, men cannot do, even with wonderful machinery and electricity and all their discoveries, the things which the smallest blade of grass does all the day without "trying," without thinking about it, or making any fuss at all! Very likely men may some day learn how to do the things that the plant now does for us and for all animals; and perhaps, after a long time, men may become so clever that, with great trouble and much preparation, and great noise and planning and expense, they may be able to do so well what plants now do for us that it might be possible to do without plants altogether; but I really do not think that that time will ever come. Even if, after thousands of years, we learnt to do what plants can do, we could never do it so easily and cheaply and quickly and well as they do. We can never beat perfection, and the way of the plants is perfect.

Now, what is it that plants do so well, and animals cannot do at all, but yet cannot do without? Animals breathe and grow and feed just as well as plants, and sometimes even more quickly; but the great difference is that plants can feed on anything, so to speak, whilst animals can only feed on what plants have made for them. You know, perhaps, what a vegetarian is—someone who eats vegetables or plants, but not the flesh of animals. Now, all animals are really vegetarians. Even if we eat beef, the ox had to eat grass. It is from grass that the ox made the beef we eat, and if there were no grass, where would beef come from?

THE MARVELLOUS THING ABOUT PLANTS IS THAT THEY EAT ALMOST ANYTHING

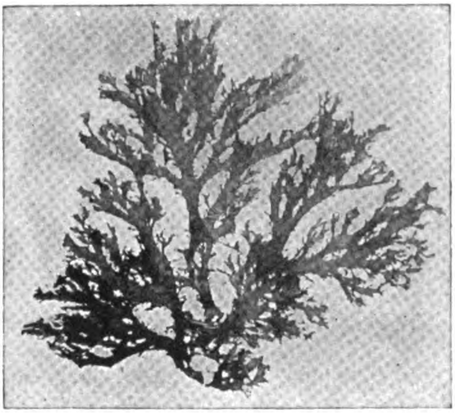
Now, we see how important this is if we remember that every living thing must eat or die. When we say "eat," you think of putting something into your mouth and biting it; but many living things have no mouths, and still they eat. If we say they *feed*, that will be better. That is one of the great differences between what is living and what is not living. If a fly, or a man, or a blade of grass, gets no food it will die; but a stone will remain just the same for hundreds of years without any need of food. The stone is not alive. That shows us how important is the great food question.

And the marvellous thing about plants is that they feed on almost anything, on things that are not alive, and never have been alive, whilst animals can only feed on *them*. Both the animal and the plant may be starved, and then both will die; but the animal having air and water and lifeless earth will die of starvation, whilst for the plant these lifeless things, with which the animal can do nothing, are a rich and plentiful feast.

We see, then, why we can be sure that the first kinds of living things were plants. No kind of animal could have been first, because there is no kind of animal that can feed itself without the help of the plant. When life first appeared on the earth, there was nothing for it to feed upon but lifeless things, like air and salt and water; and the only kind of living creature that can live on such things is the plant.

PLANTS LIVE NOW EXACTLY AS THEY LIVED MILLIONS OF YEARS AGO

Now, what plants did at first they do still. This is very interesting if we think what a great difference there is between those first simple plants, with their short lives and tiny bodies, and the great tree of to-day. Yet these trees, different in so many ways, living for hundreds of years, and sometimes so large that you could drive four horses abreast through the trunk of one of them, feed in just the same way as the first plants that were formed at the bottom of the sea ages ago. It is just because the little plants of long ago and even the biggest trees of to-day do their feeding and growing and breathing in the same way that we group them together, calling them all plants, and giving the name of *vegetable life* to that which they all show.



Life began in the sea, and nearly the first living thing, perhaps, was the seaweed such as we find on the beach.

Now let us see the way in which plants have become more wonderful since the beginning, and then, after we have seen what the story of plant life has been, we can look more closely at the way in which it serves us.

If we dig down very deeply into the earth we find ourselves passing through the first layer to another layer of a different kind, and then to another and another, and so on. We know that these different layers, lying below the one that we live on, were once at the surface, or the "top," and then have been covered up; and so as we dig down, and find remains of different kinds of animals and plants, and proof that they once lived in one layer or another, we can tell something as to what the story of life has been on the earth. This is most important and interesting so far as the story of animal life is concerned, and men have been studying it carefully for many years. We shall have to talk about it later. It is only a very few years, however, since men began to understand the history of plant life as it is shown in the record of the rocks. Of course, you can guess a good reason why it is so much more difficult to find out what the plants of long ago were like than to tell the story of animals of long ago. Nearly all animals have *bones*, which are hard things, and may last for ages, or at any rate leave marks that last for ages. It is not so easy for a plant to be preserved, because most of it is soft, and the oldest plants were altogether soft. However, we have learned a great deal about the history of plants quite lately. And this is what we find: If we dig down far enough, we come to layers of the crust, or shell, of the earth that have no signs of life of any kind, whether animal or vegetable. Above these layers we begin to find the first records of the story of life—records of vegetable life and of animal life.

THE VERY FIRST THINGS THAT LIVED ON THE EARTH

You can guess, perhaps, what kind of plants those first ones were. There were no trees or flowers, but there were plants rather like seaweed, and also simple plants of a very humble kind that were close relatives of simple plants of to-day, like the mushroom and the toadstool. Those men who know most about this matter are also sure that near the very beginning of life there were to be found the kinds of plants which we now call microbes, some of which are apt to enter our bodies now and make us ill. Then, again—and this is very interesting—we have sufficient proof to make sure that, at the very beginning, or at any rate as soon as there was any animal life at all, there were green plants—the simplest kind of green plants. Now, it is easy to tell you why this is so important. It is the green stuff in the plant, as we shall see in a very short time, that makes it able to feed upon the air, as animals cannot do; and therefore, so soon as we find any traces of animals, we should expect also to find traces of green plants, for we are assured that, without green plants, there would have been no animals at all.

THE GIANT FERNS THAT GREW LONG AGO AND HAVE NOW TURNED INTO COAL

So, when we do find traces of green plants as soon as we should expect to find them—that is to say, at least as soon as the first animals—we are well pleased. As long as we could not find plants so soon as that, we were puzzled to understand how animals could live at all.

Then, higher up, later in history, and nearer our own days, we find evidence that plant life was becoming richer, and the bodies of the plants becoming bigger and more powerful. This stage is the stage of the *ferns*, and in those days everything seems to have been just exactly right for the life of ferns, which flourished richly for a long, long time. They became very large, too—giant ferns, such as we cannot see nowadays—and the age through which they lived must have been a very long one. The remains of these are now changed into coal, and very useful we find them to-day all over the world.

THE TIME WHEN THE FLOWERS CAME INTO THE WORLD

But all this time there is no sign at all of what are called the higher plants; there were no trees, no flowers, or, to use a general sort of word, there were no *flowering plants*. Perhaps you think that flowering plant is a funny word to apply to a tree, because, though you know many kinds of trees that bear flowers, perhaps you think you know many other kinds that do not; but, as a matter of fact, all trees bear flowers, without a single exception, and all trees are just the largest and most wonderful kinds of flowering plants. It was not until long ages after the time of the ferns that the flowering plants appeared.

When this new kind of vegetable life appeared, it soon made room for itself. Many of the kinds of plants that had a good time of it before died out, either altogether or very nearly. The flowering plants were cleverer than any of the older kinds; they were fitter to live in the world that they found around them, and so they succeeded. Just as animals with backbones are the masters of the animal kingdom, so the plants that bear flowers are the masters of the vegetable kingdom. They have not entirely destroyed all the older kinds.

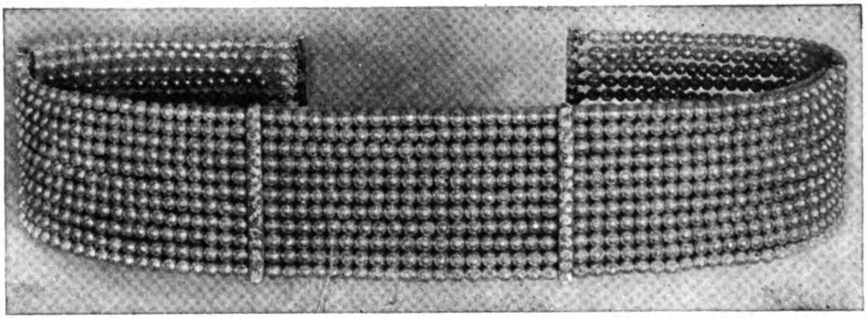
We can still find living plants of lower kinds, which are really not very different from many of the plants found deep down in the earth, and which lived at a time when there were no flowering plants at all. But, still, the story of the plants is a story that leads steadily up from very small beginnings to the flowering plants, including all the mighty trees, and nearly all the other kinds of plants are, so to speak, just allowed to go on living; the flowering plants are the masters.

THE PLANTS LEARN NOTHING NEW, BUT LEARN TO DO OLD THINGS BETTER

But with all these changes and through all this long history, certain great powers possessed by the earliest plants, and certain things in the way they are made, have gone on, and the only difference has been that, age after age, plants have learnt to make more and more of these powers; so that, if the great trees have beaten the ferns and mosses, it is only because they have learnt to do in a better way what the mosses and the ferns have long been doing not quite so well.

As we shall see, this is not the case with animals. During the ages they have learnt to do new things, and have made fresh powers for themselves, some of them so wonderful that we can scarcely guess how they came; but the vegetable world has merely learnt how to do better the things it has been doing from the first. So far as their long history is concerned, this is the chief difference between animals and plants.

The next part of this is on page 227



HOW AN OYSTER MAKES A PEARL

CONTINUED FROM 74

The oyster, with its hard, rough shell and its soft, flabby little body, is not a beautiful thing to look at, but it gives us one of the most beautiful things in the world. From the oyster we get the pearl.

How does the oyster get its pearls? It makes them in the strangest way. When the oyster is a tiny thing it floats about on the top of the sea, without any shell, just like a little piece of jelly. But when the shell begins to grow, the oyster gets too heavy to swim, and has to sink down to the bottom of the sea. It is quite happy there. It fastens itself to a rock or to something else, and opens its shell and lets in the sea-water, which has in it the little things which the oyster eats to make it fat and big.

But sometimes it gets more than it wishes to have. A tiny speck of sand enters the shell and presses against the oyster's body. Perhaps it may be the egg of a fish or a tiny speck of a sea insect. The poor oyster cannot get it out; but, as it cannot bear to be tickled by whatever it is which has got into its shell, it sets to work to cover it over and make it smooth.

Then something very wonderful happens. From the oyster's body there comes a fluid, which covers the sand, or whatever it may be. The fluid hardens. Then there comes more and more fluid, layer upon layer of it. This also becomes hard, and in time that little speck of sand is changed into a lovely pearl. It has grown bigger and smoother as the fluid has settled on it, just as a snowball grows. This is the sort of pearl that ladies wear in rings or in bracelets. But there is another sort of pearl. This is the lining of the oyster-shell. It is called mother-of-pearl, and is used to make ornaments and buttons and the handles of knives and forks.

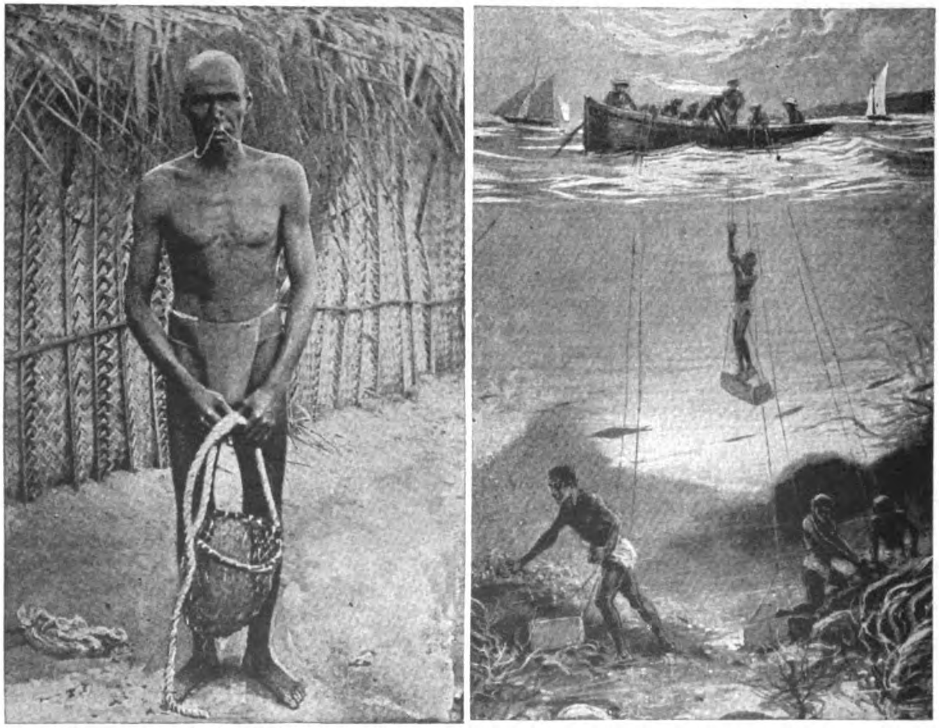
The oyster's shell is very rough outside, but he must have a smooth bed on which to lie, and so he sends out his fluid to harden and to coat the inside of the shell smooth and beautiful like the loveliest enamel, only better.

The best pearl-oysters are found off parts of the coast of Australia, New Guinea, Borneo, the Philippine Islands, and Ceylon. They are brought up out of the sea by brave divers, as the pictures on the following pages show.

Some of the divers who are able to catch an oyster with its shell open drop little things in to become coated with pearl. There are in the Natural History Museum, in South Kensington, London, a collection of shells into which the Chinese put some figures of little idols. These idols are now quite coated over with mother-of-pearl. The outside of the shell wears away in time, until the inside becomes the outside. But as the outside wears away, the oyster keeps building up the mother-of-pearl inside, so that the shell shall not become thinner or less safe for his home beneath the sea.

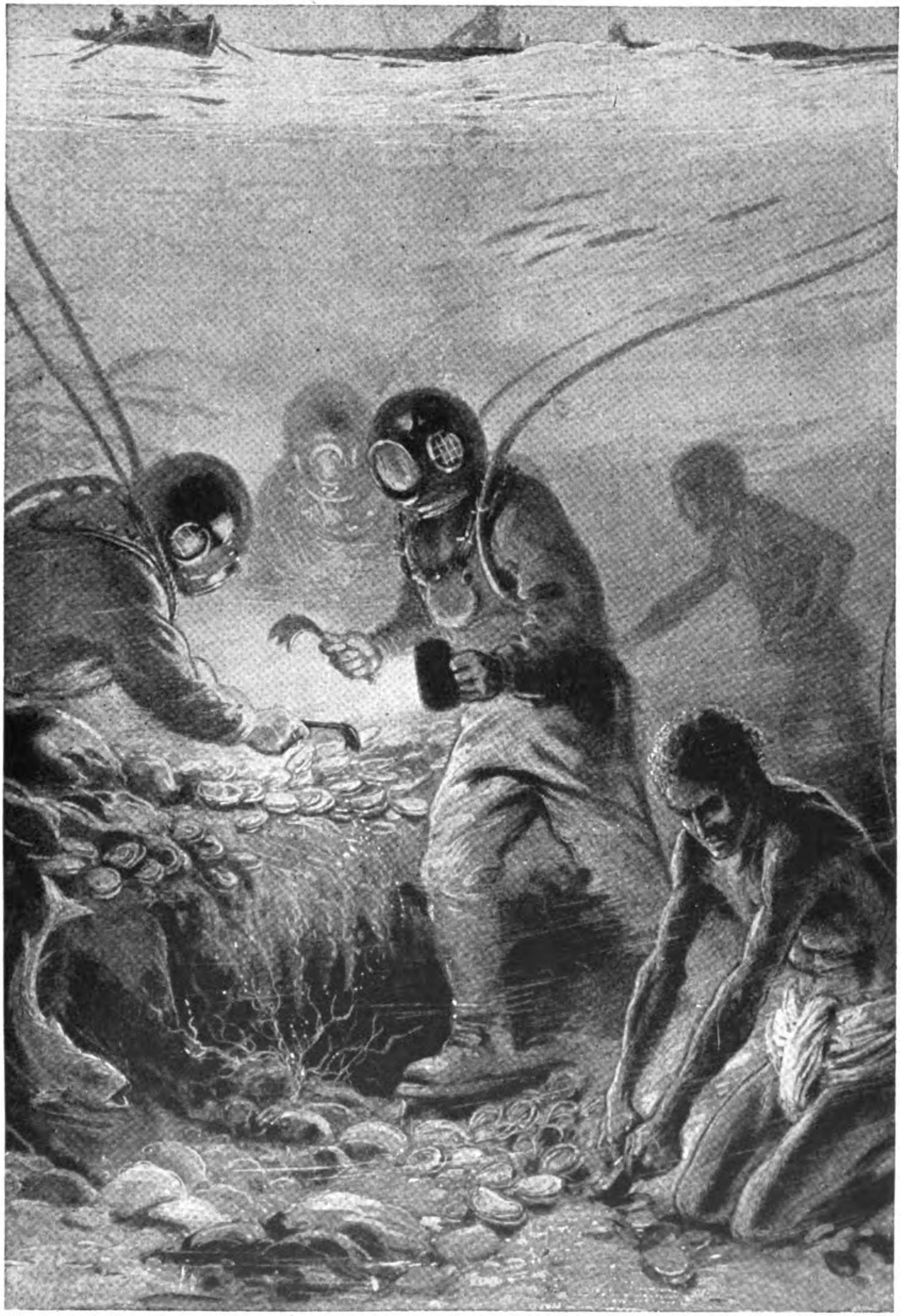
THE PEARL-DIVERS READY FOR WORK

This picture shows a pearl-fishing fleet at anchor, ready to set sail for the fishing ground. Fishing for pearls in Ceylon and India is permitted for only a few weeks in each year, always in March and April. A boat carries the divers to the fishing grounds, usually setting out at midnight, so that the divers can begin at sunrise.



These two pictures show the diver ready to go down and at work at the sea-bottom. The curious thing on his nose is a piece of horn, which closes his nostrils, so that water cannot enter while he is diving. When the diver is ready, a man in the boat holds a rope having a large stone at the end. The diver stands on the stone, and is then let down into the sea. He remains under water for about a minute at a time. If he were to remain much longer he might be drowned. The diver must beware of sharks when at work, and usually carries spikes to defend himself with if attacked. He puts the oysters into a net and brings them to the surface.

FINDING PEARLS AT THE SEA-BOTTOM



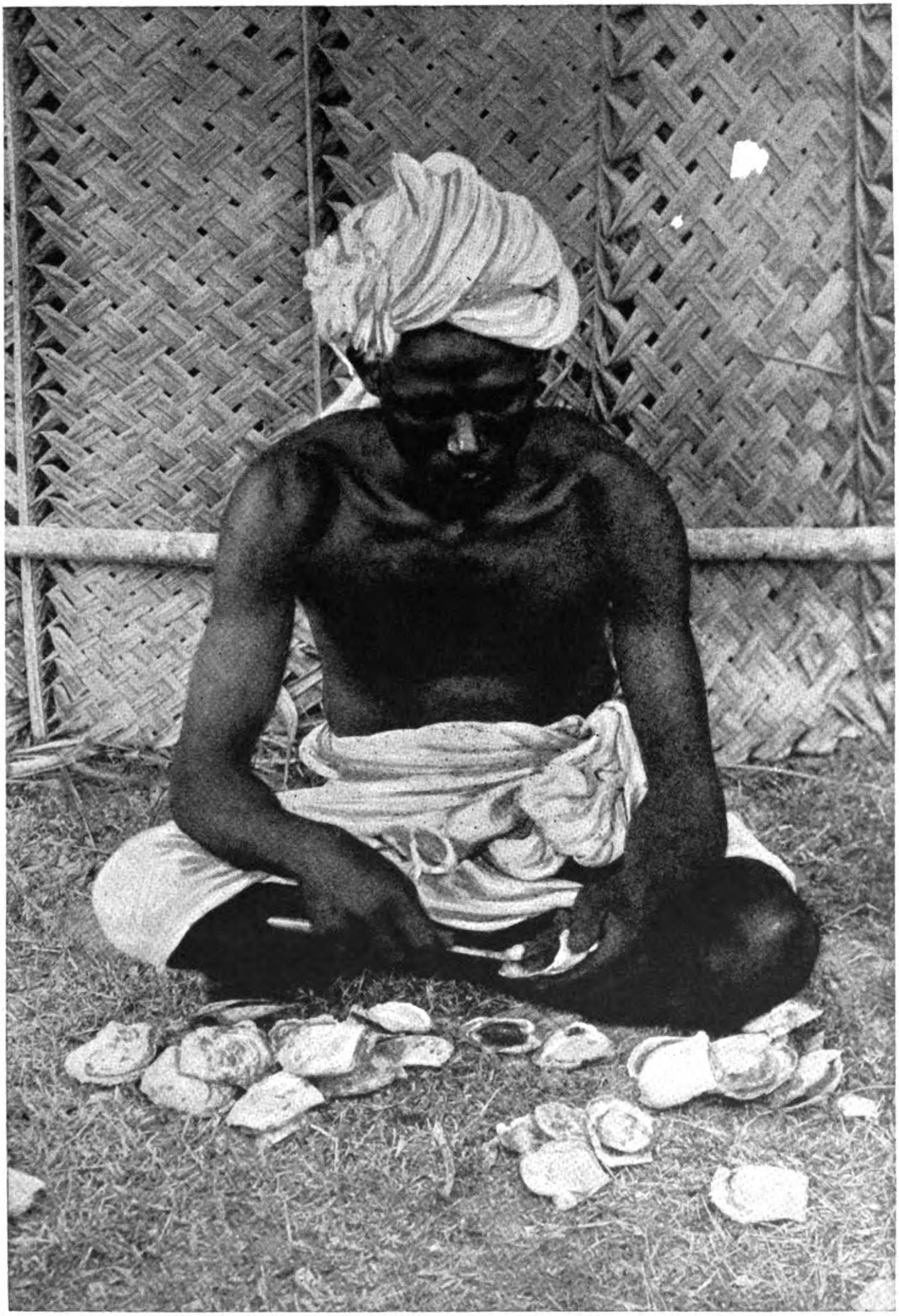
Many pearl-divers work with no protection except the simple arrangement to close the nostrils which is seen in the previous picture. They remain in the water only a very short time, and must return to the surface to breathe. The divers seen here stay below much longer. The curious diver's dress seen in this picture enables men to breathe at the bottom of the sea. The chief part of the dress is a large helmet, covering the head completely, and having attached to it a tube leading to the surface. The men in the boat pump air into this tube, so that the divers below can breathe. The front of the helmet is glass, so that the diver can see to work.

BRINGING THE OYSTERS TO SHORE

The pearl-divers work from about sunrise to noon, when the boats set sail for shore again. In this picture the boats have returned to shore and are landing the oysters, which are carried on shore by the divers.

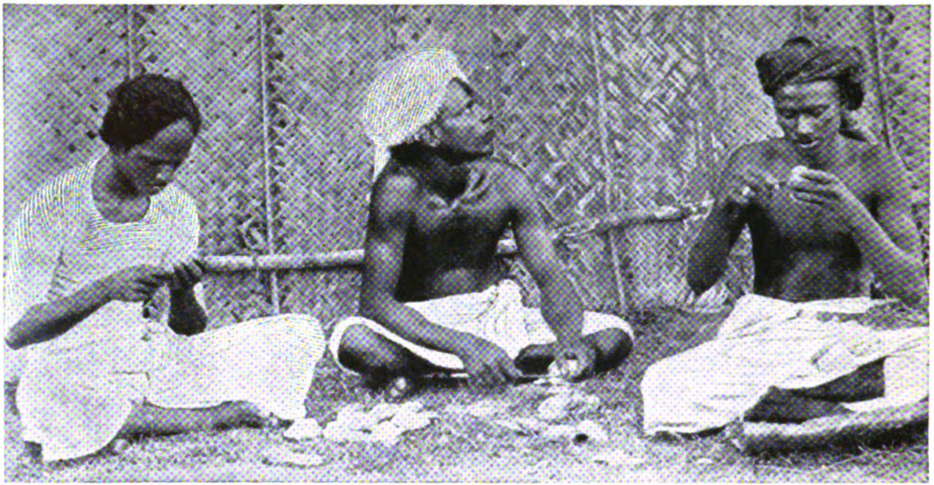
This picture shows one of the sheds into which the oysters are carried, and the baskets into which the oysters are put. The men in the picture are merchants who come to buy the oysters. If they are fortunate enough to find many pearls in the oysters they make a great deal of money, but if there are not many pearls they may lose money.

LOOKING FOR THE PEARL IN THE OYSTER

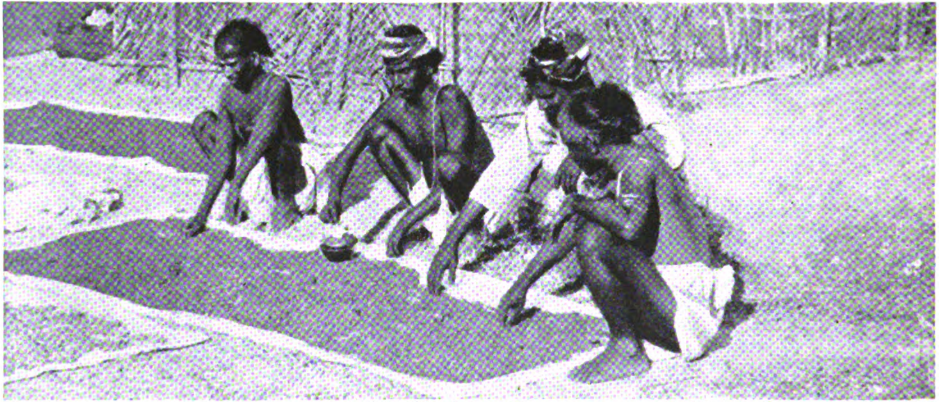


This man is opening a pearl-oyster, and we can see the long knife that he uses for the work. He has found a beautiful pearl as big as a large pea, and it may be seen at the point of the knife. On his left in front are the oysters he has opened, and on his right are those he has still to open, which may contain precious pearls.

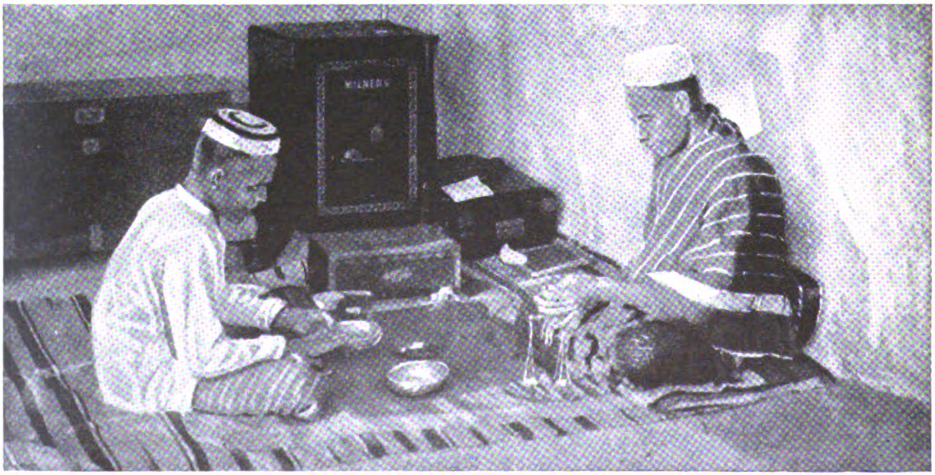
THE PEARLS READY FOR THE MARKET



These men are cleaning and opening the oysters in the hope of finding pearls in them. If the pearls found are large they are valuable, but small pearls are not worth much money. Very tiny pearls are called seed pearls.



Pearls are too precious to lose or waste, and in this picture the men are seen looking in the oyster refuse and the shell-dust for any small pearls that may have been lost. Only very small pearls are ever found at this stage.



This does not look like a jeweller's shop, but it is one. This picture shows us the men weighing the pearls and sorting them out according to size, colour, and shape. The most precious pearls are, of course, the largest and **best shaped. The wonderful story of how pearls are made by oysters and found by pearl-divers is told on page 829.**

The next FAMILIAR THINGS begin on page 223.

A STORY OF THE REDSKINS

THERE is no more picturesque figure in modern romance than the American Indian. Fenimore Cooper, whose life-story is told in this work, became famous for his stories of adventure among the Redskins, and this is one of his best-known tales told over again as a short story. Cooper wrote this romance of the American wilderness in 1826, at a time when the Indians were still fairly numerous, often taking to the warpath against the white settlers, and having their encampments even in the Great North Woods of New York; but now the race is greatly reduced, and the "noble red man," as described in romance, will ere long have entirely disappeared from his native scene.

THE LAST OF THE MOHICANS

CONTINUED FROM 72

IT was summer-time in the year 1757, when the American colonial forces were carrying on a war with the French, then masters of Canada. Always subject to attack by the different tribes of Indians, who were still numerous and formidable, the American colonies were at this time more disturbed than ever, as war between the French and the British also involved outbreaks with the Indians, some of the Canadian tribes taking to the warpath and coming down into the British colonies. Danger lurked everywhere; even the townships were not secure from attack.

But one day, in the still beauty of July, three strange and picturesque figures made part of a striking scene in the American wilderness—a scene so peaceful to look upon that one might never have guessed how near to the most exciting adventures all three were. On the high bank of a swift and swollen river the men were grouped in attitudes of ease. The dull thunder of a waterfall told that the river had come down from the higher land at no great distance away, with a tremendous fall that now sent the water boiling and churning between the steep banks.

Of the three, there were two whose dark, ruddy skins and paint-bedaubed features and bodies, with their picturesque costumes of skins and feathers, betokened them natives of these wild lands of the West. One was older than the other, for, indeed, they were father and son. The old Indian was Chingachgook, known as the Great Serpent, the sagamore, or tribal chief, of the Mohicans, the remnant of a tribe of the Delaware Indians. He had all the dignity and alert bearing of an Indian chief, though his body had no longer the supple beauty and suggestion of boundless energy of his son, Uncas, known as the Bounding Elk.

The third person of this little group wore a green hunting-shirt and Indian moccasins, and there lay across his knees a rifle of unusual length, the trigger of which he fingered from time to time. Almost as dark of complexion as his companions, by long exposure to the sun, it would have been difficult to tell him for a white man; but such he was, and his name was Nathaniel Bumppo. To the Indians, however, he was always known as Hawkeye, while his fame as a fearless scout and hunter was known to the French enemies, by whom he was usually spoken of as Long Rifle.

The three men were talking quietly, and, though they showed no uneasiness, they were evidently on the alert, for they knew that General Montcalm, the French leader, was even then making his way through the far-spreading forests, over which their position gave them a splendid view, on his way to invest the British in Fort William Henry, on Lake George, which was only a few leagues away from the scene.

Suddenly the old Indian, laying his ear to the ground and listening intently, exclaimed: "The horses of white men are coming!" Quickly taking cover, they had not long to wait before the cavalcade came into view. It consisted of a British officer, who wore the uniform of a major in the colonial service, and beside him rode two beautiful young women, one fair-haired and blue-eyed, and the other bewitchingly dark. They were accompanied by an Indian guide and a strange, gaunt creature of unkempt appearance. Hawk-eye's voice rang out in challenge as he presented himself to the little group, and it was with evident relief that the officer answered him.

"I am Major Duncan Heyward, and these ladies are the daughters of Colonel Munro, who is in command at Fort William Henry, whither we are bound. Unfortunately, our Indian guide has lost his way, and we should be glad if you could help us to regain it."

BETRAYED BY THE REDSKIN, AND A PERILOUS JOURNEY IN A CANOE

This was enough for the hunter to know that the Indian had betrayed the party. "An Indian lose his way!" he said, scornfully, as he made a sign to his own companions, who immediately slipped into the bushes to cut off the false guide. But with a wild shriek the guide bounded away, and succeeded in eluding them.

It was clear that the travellers had been betrayed, and no time was to be lost if they were to escape falling into the hands of the Iroquois, for the guide was known as a chief of the Hurons, a tribe of the Iroquois. Dusk was gathering, and there was no hope of reaching the fort that night, so Hawk-eye led the four strangers down to the river's edge, giving the horses over to his Indian companions, and from a place of concealment drew forth a frail birch-bark canoe, in which the travellers took their seats with no little difficulty, as it was overloaded with five persons. Only the marvellous skill of Hawk-eye and his calm steering through the surging water against the current saved them all from drowning. But it was their only hope of escape, and the four people sat in the canoe scarcely daring to breathe, while Hawk-eye coolly impelled it forward by his dexterous and powerful strokes of the paddle. Meanwhile the two Mohicans led the horses into the water and took them up-stream some considerable way to a little cove, where they would not be readily discovered. Thus, by walking the animals through the flowing water, no trail was left for the Iroquois to follow.

A STRANGE HIDING-PLACE UNDER A WATERFALL

It was black night when Hawk-eye at last brought the canoe with amazing skill into a little space of quiet water that lay alongside a rocky island over which the great waterfall descended like a mighty screen. Even when they had stepped on to the island, the travellers were still afraid to move, being in terror of the darkness and the deafening thunder of waters. There they stood, scarcely daring to exert a muscle, while the hunter shot away rapidly in his canoe to bring back the two Indians and a store of venison from their cache, or hiding-place. He seemed to be gone only a little while when he was back with his companions, and contrived to make the travellers comfortable for the night.

Hawk-eye scarcely hoped that their hiding-place beneath the waterfall would escape discovery, and he had only chosen it the better to withstand an attack from the Redskins, which, sure enough, was made soon after dawn next day.

But the favourable position, and the cavernous nature of the island on which Hawk-eye had placed his party, together with his great skill as a shot, in which the two Mohicans were very little inferior, kept the savage Redskins at bay until another night had come.

CAPTURED BY THE HURONS, BUT RESCUED BY HAWK-EYE AND THE MOHICANS

The situation was now desperate. Their powder was done, and the next morning would see them all shot or captured. A little council of war was held. It was decided that the scout and the two Mohicans should slip into the water, reach the bank, and make their way to the fort in the darkness, returning at once with a rescue-party. All agreed that the Redskins would make captives of the others in the morning, and it was necessary that the rescue-party should be as strong as possible. Next morning the Hurons returned to the attack, and, meeting with no opposition, made their way to the hiding-place, where they found Major Heyward and the two girls with the fourth member of the party, who had described himself as David Gamut, a singing-master, attached to a Connecticut regiment, and who was really not quite sane. Instead of scalping his victims, Magua—for such was the name of the false guide—decided to take them captives, and as David Gamut insisted on singing a funeral psalm when he was captured, the Indians left him practically at liberty, believing, like many savage people, that persons of disordered minds are under a special protection. The real reason of Magua's betrayal was to be revenged on Colonel Munro, at whose orders he had once been flogged.

Happily, Hawk-eye and his companions, replenishing their powder from a secret store, had boldly started back on the trail without going to the fort, and in the nick of time overtook the Iroquois on the march with their prisoners, putting Magua and his braves to flight and releasing the captives.

THE FALL OF THE BRITISH FORT AND RECAPTURE OF THE COLONEL'S DAUGHTERS

The little party then pushed on towards Fort William Henry, and when they drew near they found that Montcalm's troops had begun the investment of the place. By good fortune, one of the mists that rise suddenly from the lake came on, and Hawk-eye, knowing the land so well, was able to lead the party through the French lines unseen, to the great joy of old Colonel Munro, who had made every preparation to defend the fort against the enemy.

How bravely the old Scottish warrior and his small garrison, chiefly composed of the "Royal Americans," the regiment in which Heyward was major, defended Fort William Henry against the overwhelming forces of Montcalm is told in many a history of these old colonial days. The end of it all was that Munro and his garrison had at last to surrender, but they were granted the privilege of marching out with the honours of war and a safe conduct to Fort Edward. This proved a hollow promise, as they were attacked on their march through the forest by some two thousand Indians, who were attached to Montcalm's army, and a general massacre took place. Magua had also seized the occasion to reappear with a small band of Hurons, and, in the confusion that followed, he succeeded in carrying off the sisters and the half-witted singing-master.

ON THE TRAIL OF THE INDIANS, TO THE RESCUE OF THE CAPTIVES

Colonel Munro and Major Heyward, as well as Hawk-eye and the two Mohicans, managed to escape from the fray, and, Uncas being certain that Cora and Alice had been taken captive by the Hurons, it was decided to make for the Great North Woods, in the hope of rescuing the girls, as in that district of the American wilderness the Hurons had an encampment. The Delaware Indians were also encamped there, and the Mohicans were of the same race. Day after day the little party of five followed the trail into the depths of the wilderness until they felt they were nearing the Indian camp.

Emerging cautiously from the wood through which the trail had led, they saw below them a colony of beavers at work in a stream. A strange figure stood there watching the busy little animals. This was none other than Gamut, the singing-master, whose attention the party cautiously attracted, and they learned from him that Alice was a prisoner among the Hurons, whose camp was some two miles off, while Cora had been placed in the keeping of the Delawares ten miles away. So far the captives had suffered no harm, but what fate was in store for them, who could guess? Gamut, not so mad as he seemed, had been allowed the fullest liberty by the Indians, and his help proved of great value to the rescuers.

UNCAS, THE YOUNG MOHICAN, FALLS INTO THE HANDS OF THE HURONS

Speedily their plans were agreed upon. Heyward was to disguise himself as one of Montcalm's scouts, and boldly visit the Huron camp in the hope of rescuing Alice, while Uncas and Hawk-eye were to make for the camp of the Delawares and rescue Cora, the old colonel, under the guidance of Chingachgook, going to a place of safety along the stream.

The singing-master took Heyward, disguised as one of Montcalm's scouts, to the Huron camp, where he was received by a council of the Indians, and was parleying with them when Uncas was brought in as a prisoner. Magua, arriving with his party of braves, was overjoyed to find his enemy at his mercy, and while some of the Hurons would have killed the young Mohican chief at once, Magua preferred keeping him alive to torture him later.

HOW THE MAJOR DISCOVERED HAWK-EYE INSIDE A BEAR-SKIN

In the commotion which the capture of Uncas had caused, Heyward and his supposed mission from Montcalm were for the time being forgotten, and the stranger in the camp was only recalled to their minds when an aged chief came forward to ask if the white brother had skill in magic. To this the major, with a little hesitation, not knowing whither he might be led by his reply, answered that he had.

Saying that an evil spirit had entered into the wife of one of his young men, the Indian then led the way to a cave in the mountain-side, some little distance from the camp, where a young woman lay, evidently very ill.

"Now let the white brother show his power," said the old Indian to the major. "I go. Brother, the woman is the wife of one of my bravest young men; deal justly by her. Peace," he added, beckoning to a large tame bear that had followed them into the cave, rolling and grunting, to be quiet. "I go."

The old Indian then left the supposed worker of magic in the cave, and he had no sooner gone than the animal, which Heyward took to be one of the tame bears sometimes kept in Indian villages, rose on its hind legs, and, lifting up its great, ungainly head, disclosed below the bronzed face of Hawk-eye, the scout!

THE SCOUT AND THE MAJOR OUTWIT THE INDIANS AND RESCUE ALICE

After his first moment of surprise, Heyward said to the scout: "Tell me the meaning of this masquerade. Why have you attempted so desperate an adventure?"

"The capture of Uncas is my reason for being here, and his own hot blood was the reason of his falling into the hands of the Hurons. By a stroke of luck I discovered an Indian conjurer, the owner of this bear-skin, who was preparing for the entertainment of the village in this guise, and, speedily securing him, I made free with his finery, and am here to play his part, though not quite as he had intended. But let us hasten, for Alice is most likely hidden somewhere here," said Hawk-eye.

In an inner cave they were happy to discover the fair object of their search, and just at that moment Magua appeared at another entrance, only to be instantly disabled by the two white men, and bound and gagged. Quickly wrapping the girl in a blanket, Heyward took her in his arms, and, followed by the scout, who again imitated the walking of the bear, they appeared at the entrance of the outer cave, where were some of the relatives of the sick woman.

"Has my brother driven away the evil spirit?" demanded the old Indian. "What has he in his arms?"

"Thy child is better," returned Heyward gravely. "The disease has gone out of her; it is shut up in the rocks. I take the woman to a distance where I will strengthen her against any further attack. She shall be in the wigwam of her husband when the sun comes again."

THE HURONS DEMAND THE RETURN OF PRISONERS FROM THE DELAWARES

This speech satisfied the people, so, followed by the bear, Heyward, bearing Alice, passed boldly through the crowd and into the woods. When they had gone some distance, the scout urged Heyward to make with all haste for the camp of the Delawares and demand protection, as they were friendly Indians, but Hawk-eye would return to try to save young Uncas, in whose veins ran the last high blood of the Mohicans.

When the scout had reached the outskirts of the encampment again, he encountered Gamut, and disclosed his plans to him. Singing his loudest, Gamut led the way to the wigwam where Uncas was imprisoned, and told those who watched that he and the bear-conjurer were going to work a spell upon the captive. Believing that within the skin of the bear was the form of their own favourite magician, and that Gamut himself had supernatural power, the Indians made way for the two to enter. No time was lost now in making Uncas exchange places with Hawk-eye, while the scout changed his own clothes for those of the singing-master, whom they were to leave behind, knowing that the Indians would do him no harm. The ruse was successful, and thus

Hawk-eye and Uncas escaped into the forest, eluding the pursuit which the Hurons soon began when they discovered the deception that had been practised.

Major Heyward in the meanwhile had made such good haste that he arrived safely with Alice in the camp of the Delawares, and was granted protection; but when Hawk-eye and Uncas came later and asked for hospitality, they were placed under guard, though not unkindly treated.

Next morning Magua and a band of his followers appeared in the Delaware camp, dressed and painted as if for peace, to claim the return of their prisoners. A great council of the Indians was called, over which the oldest chief, named Tamenund, presided.

"Justice is the law of the Great Manitto," said the venerable chief, Tamenund, then over a hundred years old, in delivering judgment. "My children, give the strangers food. Then, Huron, take thy prisoners and depart."

UNCAS, THE LAST OF THE MOHICANS, FINDS HIS OWN PEOPLE

But the Indian who leapt forward to bind Uncas stood open-eyed with amazement, and pointed to the bosom of the captive, on which the figure of a small tortoise, tattooed in bright blue, was now seen, his breast-covering having become undone.

"Who art thou?" demanded Tamenund, strangely agitated.

"Uncas, the son of Chingachgook," answered the captive proudly, "the son of Unamis, the Great Turtle."

"The hour of Tamenund is nigh!" exclaimed the aged chief. "Uncas, the son of Chingachgook, is found. Let the dying eagle gaze on the rising sun." And all who looked upon the young Indian knew him for the hereditary chief of the Turtle clan of the Delawares, among whom he now stood. Uncas was set before the people as their chief, and now Magua stepped forth and insisted on his right to Cora, the prisoner whom he had left to be guarded by the Delawares.

"It is the law," said Uncas. "Take your captive with you, and go. The sun is now among the branches of the hemlock-tree, and your path is short and open. When he is seen above the trees there will be braves on your trail." And surely, as Uncas said, the Delawares, under their new chief, went forth on the trail of the Hurons in accordance with Indian rules of war. The scout and Heyward headed another party of Indians, and, picking up Colonel Munro and Chingachgook on the way, were to attack the Hurons in the rear.

THE UNHAPPY FATE OF CORA, AND THE END OF A BRAVE YOUNG CHIEF

Desperate fighting took place at the Huron camp, and Magua and his braves, who still held out, were forced to find refuge in the rocky heights that overhung their camping-place. There they were pursued by the Delawares, and no mercy was shown. Uncas had marked down Magua for his own vengeance; but the crafty Huron had carried Cora with him, and Uncas could reach his enemy only by jumping from one perilous ledge of rock to another.

As he took the fatal leap, the Huron plunged his knife into the unfortunate Cora, and, with a wild shriek, Uncas stumbled and fell at the feet of Magua, who buried his tomahawk in the back of the brave young chief. With a shout of exultation, the Huron now sought to escape by leaping across a chasm, and all but succeeded, grasping the roots and grasses on the farther edge, and with his giant strength pulling himself up until it seemed as if he had won. But at that moment the rifle of the scout rang out, and the body of Magua fell whirling into the depths below.

Uncas and Cora were laid to rest with all the wild ritual of the tribe, and the old colonel, bowed with grief at the tragic fate of his daughter, was guided back to civilisation by the scout, accompanied by Heyward and Alice.

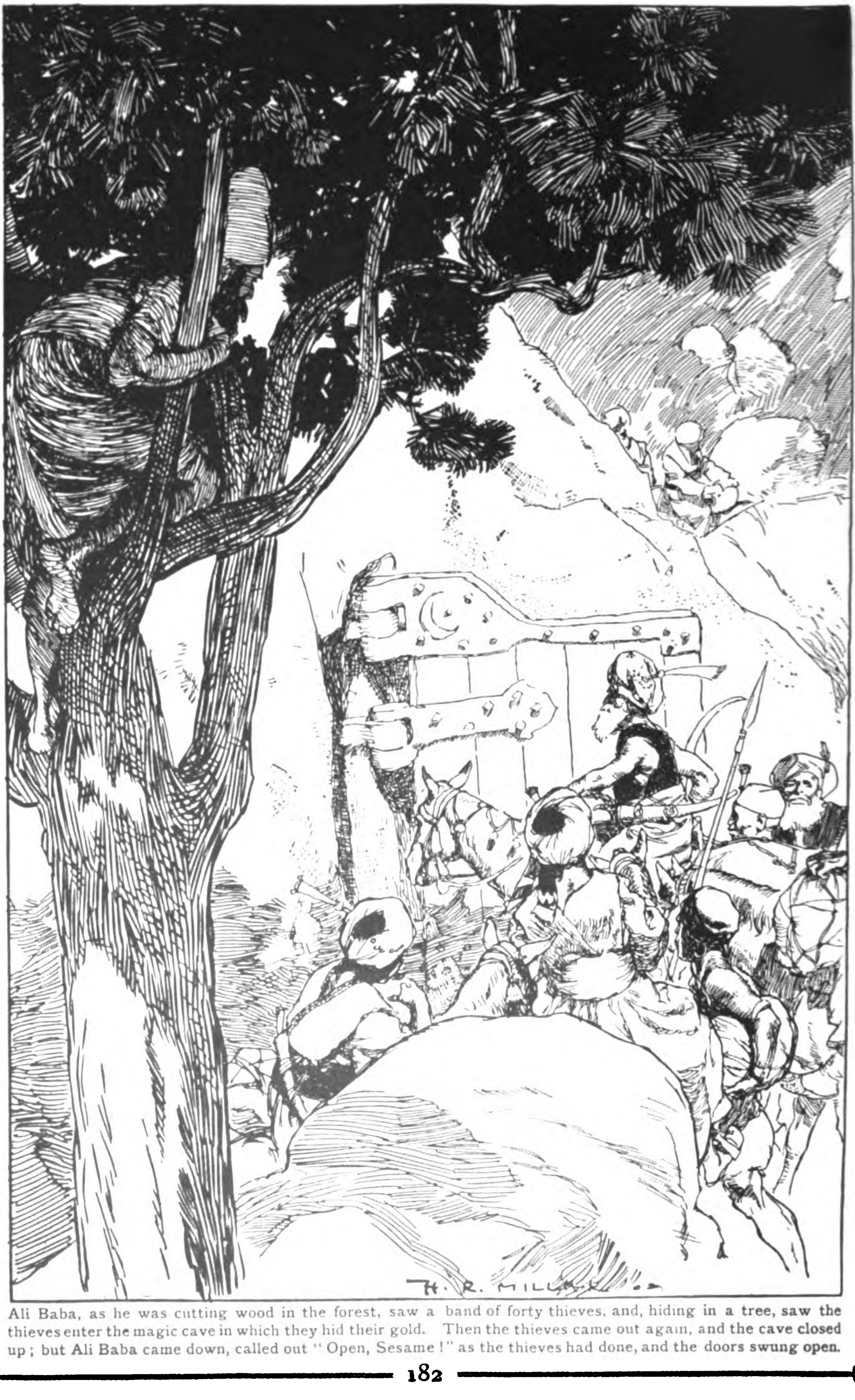
As for Hawk-eye himself, white man though he was, he had lived too long in the wilderness to care for the ways of townsfolk, so he returned to be with Chingachgook and the Delawares.

THE MOHICANS MOURN THE DEATH OF THE LAST OF THEIR CHIEFTAINS

The joy of the old chief, Tamenund, had been short-lived, and his last words were: "My children, the pale-faces are masters of the earth, and the time of the red men has not yet come again. My day has been too long. In the morning I saw the sons of Unamis happy and strong; and yet, before the night has come, have I lived to see the last warrior of the wise race of the Mohicans."

The next part is on page 313.

THE FORTY THIEVES LEAVING THE MAGIC CAVE



Ali Baba, as he was cutting wood in the forest, saw a band of forty thieves, and, hiding in a tree, saw the thieves enter the magic cave in which they hid their gold. Then the thieves came out again, and the cave closed up; but Ali Baba came down, called out "Open, Sesame!" as the thieves had done, and the doors swung open.

Ali Baba in the days of his prosperity

ALI BABA AND THE FORTY THIEVES

CONTINUED FROM 87

Ali Baba was a poor man who lived with his wife in a town in Persia, and one day he went into the forest to cut some firewood. He saw a band of forty thieves, and climbed into a tree and hid himself. The tree grew beside a great rock, and the forty thieves came to this rock and cried:

"Open, Sesame!"

A door opened leading into a cave, and the forty thieves went in and placed there the gold and silver they had stolen. Then they came out, and cried:

"Shut, Sesame!"

Then the cave closed up, and they rode away. Ali Baba then came down from the tree, and cried:

"Open, Sesame!"

Again the cave opened, and he entered, and found himself in a sort of treasure-house, stored with sacks of gold and silver; and, seeing that it had all been stolen, Ali Baba seized as many sacks as he could carry, and took them home.

"Now," he said to his wife, "I will soon grow as rich as my brother Cassim."

Another thought pleased him very much, for his brother was a proud and haughty man, who had married a very wealthy woman.

"We must measure how much gold we've got," said Ali Baba's wife joyfully.

So she went to Cassim's house and asked for the loan of a measure. Cassim's wife wondered what sort of grain her poor sister-in-law had got. So she put some wax under the measure, and when the measure was returned to her she found, to her immense surprise, a piece of gold sticking to it. She at once told Cassim, and Cassim went to Ali Baba and asked him where he had got his gold from. Ali Baba frankly told his brother about the treasure-house in the rock, and told him how to open and shut the cave.

"I'll have all that gold carried away before Ali Baba gets a share of it," said Cassim to himself.

He at once took ten mules to the cave with the idea of loading them with all the sacks. He cried, "Open, Sesame!" and got into the cave, and danced with delight when he saw how much treasure there was. But at last he became so excited that when he wanted to take away the sacks he forgot the words that opened the cave.

"Open, barley!" he cried. "Open, wheat!"

While he was trying to think of the right word the forty thieves returned and found him in the cave, and killed him there.

The next day Ali Baba went to get some more gold, and he discovered in the cave the body of his brother, and carried it away and had it decently buried. Then, in accordance with Persian customs, he took his widowed sister-in-law to live with him; and with her came a clever female slave, whose name was Morgiana.

When the forty thieves found that the body of Cassim had been removed from the cave, they were full of fear.

So there's another man who knows our secret!" said the captain. "But I know how to find him."

He disguised himself and went to the town, and inquired if a man who had been slain by the sword had recently been buried; and he at last learned that just such a man had been buried by Ali Baba.

"Now," said the captain of the thieves to his men, "I must arrange to get all of you quietly into the house of this Ali Baba; and you must come out at night and kill everybody there, and escape without being seen."

So he brought some of the huge leather jars in which the Persians used at that time to keep their oil, and he got a thief to get into each one of them, and covered them up, leaving a little space for air. He then put them all on some mules, and took with him one jar really filled with oil in case he should be called upon to show what he carried, and travelled at night from the forest into the town, and stopped before Ali Baba's house.

"I have brought my oil from a good distance," he said to Ali Baba, "and it is now too late to go to an inn. Will you kindly put me up for the night?"

Being a kind-hearted man, Ali Baba welcomed the captain of the forty thieves, and told the servants to look after the mules and bring in the jars. Morgiana was sent to cook a supper for the strange guest. Finding that she had no oil to fry the meat in, she went to take a little out of one of the jars. When she approached the thief thought she was the captain, and whispered:

"Is it time?"

"Not yet," said Morgiana.

She went from jar to jar, and found there was a thief in each, and at last she came to the jar which was filled with oil. She heated the oil in a great kettle, and then crept up to the jars and poured in the hot liquid, and scalded all the thieves to death.

"Now we'll see what will happen," said Morgiana.

At the dead of night the captain tried to arouse the thieves; but after peeping into the jars he saw that his men were all dead, and he rushed quickly out of the house. In the morning Morgiana told Ali Baba the whole story, and Ali Baba buried the dead thieves secretly the next night.

"But remember," said Morgiana, "there is one thief still at large; and you must be on your guard, for he will never rest until he has killed all of us who know his secret."

Morgiana was right. For the captain of the forty thieves soon returned in a new disguise, and set up as a shopkeeper, and tried to make friends with Ali Baba and get an opportunity of killing him. One day Ali Baba invited him to come to supper. Now, there is a very strange law of honour which all Persians and other Mohammedans strictly observe. Even the very worst man among them will not kill anybody with whom he has eaten salt. So the captain of the thieves said to Ali Baba:

"I should be pleased to sup with you, my friend, but I must confess I have a very curious taste. I can't bear the least bit of salt in any dish."

"Oh, that's easily arranged!" said Ali Baba. And he told Morgiana not to put any salt in the meat for supper; and that made Morgiana suspicious.

"So your new friend is a man who will not eat salt with you!" she said. "I must have a look at him."

She did so, and, in spite of the new disguise, she saw that he was the captain of the thieves. Moreover, she saw a dagger hidden in his dress. So she said to Ali Baba:

"Tell your strange friend that one of your slave girls will come and dance before him after supper."

When the supper was over she entered the room, attired in a beautiful dress, and began to dance the dagger dance. She whirled round and round in graceful movements, holding a dagger in her hand, and then rushed at Ali Baba and pretended to stab him. Then she lightly danced up to the captain of the forty thieves, but, instead of pretending to stab him, she drove the dagger into his heart.

"I recognised the villain!" she said. Then she showed the dagger hidden in his dress. Ali Baba then married Morgiana to his eldest son, and gave her as a dowry a large share of the treasure in the cave of the forest.

THE QUEST OF THE GOLDEN FLEECE

A YOUNG man and a centaur sat on the banks of a river, and the centaur dabbled his hoofs in the flowing water as he talked.

"You are now twenty years old," he said, "and the time has come for you to reclaim the kingdom your step-uncle, Pelias, stole from your father."

"Oh, master Chiron," returned the young man, "I thank you for all that you have done for me. You saved me from death when a child by hiding me from my cruel uncle. Now I am a man, and I will do even as you bid me."

As he spoke, Chiron ran his eye proudly over the slim, steel-corded limbs of his pupil.

"You will do it, Jason," he said. "Go and may the gods go with you."

Clad in a leopard's skin, with sandals tied with golden strings, a spear in each hand, Jason started.

Coming to the River Enipeus, he found the stream swollen from recent rains. There was no ferry and Jason sat on the shore to think of some means of getting across. Suddenly there appeared before him the goddess, Hera, in the form of an old woman.

"I will take you across," croaked she. "Get on my back."

Gladly Jason obeyed, and reached the opposite shore quite safely, except for the loss of one of his sandals. From the river's bank Jason hurried on to the town of Iolcus by the sea. The people in the streets, when they saw that he had lost one of his sandals, cried, "Look! Look! He wears but one sandal! He has come at last. What will the King say?" For a long time it had been foretold that a stranger, wearing one sandal, would come to Iolcus and would take away the kingdom from Pelias. When the King saw Jason he was much frightened. Then he thought he would entrap Jason by a question. "What would you do," he asked, "What would you do with a man you were doomed to be ruined by?" Jason thought. "I would send him for the Golden Fleece," he said at last. The Golden Fleece was the skin of a magical ram that had saved two children from death. It was hung upon a tree in a sacred grove in a land far away over the sea, protected by a fearful dragon. To secure the Golden Fleece would be the most difficult and dangerous task in the world.

Pelias was delighted at the suggestion, — for he thought that Jason would be killed, so he said, "You are the man. Go and bring back the Golden Fleece to me, and then I will give you my throne."

Again Jason thought. "I will go," he said fearlessly, "And when I come back you shall give me your crown."

Young Jason then went to a wonderful tree, known as the Talking Oak.

"What shall I do, that I may find the Golden Fleece?" he asked the oak.

"Go to Argus," said the tree,

"and ask him to build a galley with fifty oars, needing fifty strong men to row it."

With the help of the goddesses Athene and Hera, Jason and Argus built the Argo and invited fifty of the foremost heroes of Greece to join the adventure. One day they set sail, and at length the Argo came to Colchis, where the dragon guarded the Golden Fleece. Jason at once went to Aeetes, the king of Colchis, and told him of his errand. The king was very angry, but answered cunningly:

"Stranger, I would first test your valour and your powers. Two brazen-footed bulls I have in that pasture in the War-god's plain. The breath that comes from their mouths is flames of fire. If you will yoke these bulls and with them plough the field of Ares, and then sow the plain with dragon's teeth, then will I let you have the Golden Fleece."

It seemed an impossible task. Jason knew he could not do it without some magic help, — and where in this strange land was he to get such help? But while he had been in the king's reception hall, a beautiful girl had observed him. She was Medea, the daughter of King Aeetes, who fell in love with the sun-browned, godlike stranger, and made up her mind to save him by her magic power. So she delivered to him a box of ointment. "Take this," she told him, "and rub it on your body and your shield. It will protect you from the fiery breath of the bulls, and give you strength to overcome and tame them. Then when you have ploughed the field and sowed the dragon's teeth, throw a great stone among the warriors that will spring up from the ground. They will destroy each other instead of killing you."

The next day, Jason, with all the court of King Aeetes looking on, went into the plains to harness the fiery bulls. All happened just as Medea had said. Jason overcame the bulls because of the great strength given him by the magical ointment, and was unharmed by the tongues of flame. But when the army of warriors sprang up from the dragon's teeth it seemed as if the young man would be killed, for they all rushed upon him with drawn swords, shouting "Guard the Golden Fleece." Remembering the words of the princess, Jason threw a great stone among the on-rushing soldiers. Immediately all turned one upon another. Jason joined in the fray. When at last the battle was over, not a man was alive save Jason.

The people marvelled, and King Aeetes was so furious that he made up his mind to kill Jason and all the heroes who had come to Colchis in the Argo. The Princess Medea heard of her father's plan, and sent to Jason, saying, "Meet me at midnight and I will lead you to the sacred grove where hangs the Golden Fleece." In the stillness of the night Jason met her and together they sought the glory of the Golden Fleece. About the foot of the tree a dragon lay coiled, its great neck swaying back and forth. Suddenly Medea opened her lips and began to sing. Fixing her eyes upon the serpent, she began slowly to advance, singing — singing — all the while. In her hand she bore a spray of juniper leaf dipped in one of her magic brews. As the fumes of the stuff reached the serpent's nostrils, its eyes began to blink and close. Presently the dragon-jaws closed and the fearful creature lay asleep.

"Hurry, hurry," Medea whispered to Jason. "Get the Golden Fleece and escape, for the dragon will soon awake." Fearlessly she smeared the head of the monster with her sleeping potion, while Jason seized the Golden Fleece. Then together they fled from the grove. With a horrible roar the dragon awoke, and seeing its treasure gone, pursued the two with fearful bellows. Just as the monster nearly reached them they gained the shore. The Argo was waiting for them. With one wild leap they reached the galley, and the men hastily pushed the ship off from the land. The dragon howled and spit fire from the bank, but it was of no avail. The Argo set sail for Iolcus just as the bright dawn was streaking the West. Jason had won the Golden Fleece.

THE TALES OF UNCLE REMUS

Folk-stories are the tales told among the natives of different parts of the world—tales which have been told as long ago as people can remember. Their authors are unknown; for these old, old stories have grown gradually by being told over and over again for generations. It was left to an American writer, Joel Chandler Harris, who died in 1908, to prove that the negro people of America have as quaint and interesting folk-stories as any other race. Their stories are chiefly about the doings of animals, such as the fox, the rabbit, and the wolf. "Uncle Remus," who is supposed to tell these stories, is an old negro slave. Mr. Harris wrote many books full of these delightful tales, in the quaint, broken English spoken by the negroes, and here we give some of his stories in words that are easier to read.

BRER RABBIT AND BRER FOX

Brer Rabbit was a naughty, cunning little creature, and as saucy as a jay-bird. He was always playing tricks on his neighbours, and they were always trying to catch him. But it wasn't by any means an easy task to catch Brer Rabbit. One day Brer Wolf says to Brer Fox:

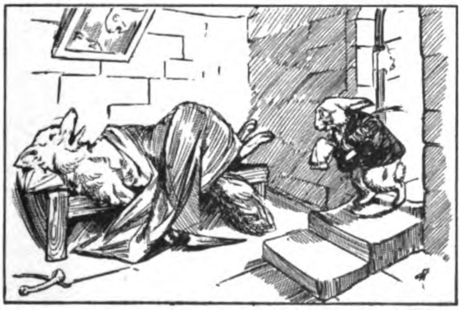
"If we don't get that little varmint for supper to-night," says he, "I'll give up being a wolf, and eat grass. You just run along home and get into bed, and make out you're dead," says he. "And don't you say anything till Brer Rabbit comes and puts his hands on you. Then we'll get him right enough."

So Brer Fox went home and got into bed, and Brer Wolf he marched off to Brer Rabbit's house, and knocked at the door.

"Bad news, Brer Rabbit," says Brer Wolf. "Poor Brer Fox died this morning, and I'm off to arrange the funeral," says he.

Brer Wolf trotted away, and Brer Rabbit went round to Brer Fox's house to see what he could see. He peeped in, and there was Brer Fox stretched out on the bed stiff as a poker, looking just as if he was dead. But Brer Rabbit was always too wide-awake to be easily deceived, and he says out loud, as if talking to himself:

"Poor old Brer Fox! I hope he isn't dead; but I expect he is. I'd better sit here till the neighbours come round. But I wonder if he's really dead," says Brer Rabbit in a kind of doubtful way. "Doesn't look like it," says he. "You can always tell when a fox is dead by the way he keeps shaking his hind leg," says he.



BRER FOX WAS STRETCHED ON THE BED

When Brer Fox heard this, he thought he'd show he was really dead, and began shaking his hind leg, and as soon as Brer Rabbit saw it he tore out of the house as fast as he could, and did not stop till he reached the safety of his own home. Brer Fox and Brer Wolf had to go to bed without any supper that night.

BRER RABBIT AND MR. BEAR

Brer Fox used to grow peas in his garden, and Brer Rabbit used to creep through a hole in the hedge and steal the peas. So Brer Fox made a mighty cunning trap. A young tree was growing just above the hole. Brer Fox bent this down, and tied a rope to the top of it. Then he made a loop-knot at the end of the rope, and fixed this over the hole by means of a stick.

MR. BEAR FINDS BRER RABBIT

The next morning Brer Rabbit popped through the hole, and knocked the stick away. The loop-knot caught him by the hind legs, the tree flew up, and there was Brer Rabbit dangling high up in the air. By-and-by Mr. Bear came along.

"Whatever are you doing up there?" says Mr. Bear.

"Making a dollar a minute—a dollar a minute!" says old Brer Rabbit.

"How are you doing that?" says Mr. Bear, very much interested.

"A dollar a minute!" says Brer Rabbit. "That is what Brer Fox is paying me to hang up here and keep the crows away from his peas," says he. "A dollar a minute! But I've plenty of work of my own to do; and you can have this job if you like, Mr. Bear," says he.

Mr. Bear said that he'd like the job, and Brer Rabbit showed him how to bend down the tree; and it wasn't long before Mr. Bear was swinging up in Brer Rabbit's place. Soon afterwards, out comes Brer Fox with a great big stick.

"So it's you, Mr. Bear, that comes stealing my peas, is it?" says Brer Fox. "You old thief, I'll teach you to break into my garden!" says he.

And he gave poor Mr. Bear the thrashing that cunning old Brer Rabbit ought to have had.

THE GREAT RACE

Brer Rabbit came to reckon himself just about the cunningest creature alive. But he did not get the best of old Brer Tortoise. Brer Rabbit said to Brer Tortoise:

"You're a mighty old crawler. If we had a race, I'd be able to sow barley as I trotted along, and it would be ripe enough to cut by the time you came by."

OUT POPPED OLD BRER TORTOISE

"Not if you ran on land and I swam in water," says Brer Tortoise.

Brer Rabbit knew Brer Tortoise was as slow a goer in water as he was on land, and he agreed to race him. They measured five miles along a river-path, and put up a post at every mile.

Now, Brer Tortoise had a wife and four children, and you couldn't tell one from another. All tortoises are much alike, and these were very much alike. Early in the morning, Brer Tortoise put his wife by the starting-post, a son at each of the first four mile-posts, and he crouched himself down at the winning-post.

By-and-by Brer Rabbit arrived, and, seeing Mrs. Tortoise in the water, he cried:

"Ready? Go!"

And Mrs. Tortoise did go. She went home. At the first mile-post Brer Rabbit saw the young Tortoise.

"Golly!" says Brer Rabbit. "Old Brer Tortoise swims pretty fast."

When he found the Tortoise at the second post, and then at the third, and then at the fourth, he began to feel very faint.

"I must get up more speed," says he. He put his ears back, and did the last mile like a flash of lightning. As he came puffing up towards the winning-post, out popped old Brer Tortoise from behind it.

"I thought you weren't coming, Brer Rabbit," said Brer Tortoise. "Been having a rest on the way, have you?" says he, laughing and rolling his black head from side to side.

Poor Brer Rabbit had run himself out, and he limped off home, humble and cast down for once in his life.

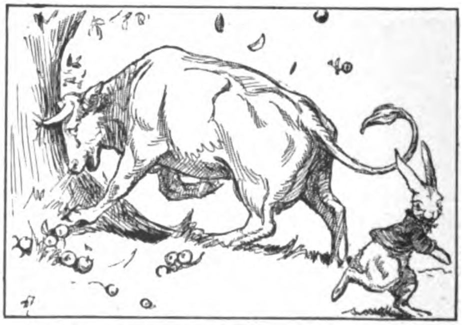
BRER RABBIT AND MISS COW

Brer Rabbit wanted some milk for his children, and Miss Cow wouldn't give him any. It was a hot day, and Miss Cow was standing in the shade of an apple-tree.

"There's some mighty fine fruit here," says Brer Rabbit. "Why don't you get some of these apples?"

"I don't know how to," says Miss Cow.

"You must butt and butt the tree until you shake the apples down," says Brer Rabbit, looking very wise.



MISS COW'S HORNS STUCK FAST

Miss Cow butted and butted, and got her horns jammed in the tree, and she couldn't get away. Brer Rabbit scooted off, and returned with his wife and children, all carrying pails, and they milked Miss Cow dry.

"You'll have to stay here all night, Miss Cow," says Brer Rabbit very politely. "But don't worry; I'll come and milk you again in the morning."

But in the morning Miss Cow got her horns free, and she laid a trap for Brer Rabbit. After a good feed of grass, she returned to the apple-tree and stuck her horns back in the holes. Brer Rabbit, however, was up very early that day, and he saw what Miss Cow did.

"I haven't had any rest all night," says Miss Cow. "Brer Rabbit, do catch hold of my tail and help me pull my horns out."

"No," says Brer Rabbit. "You do the pulling and I'll do the groaning."

Miss Cow jerked out her horns, dashed after Brer Rabbit. Helter-skelter they went down the road. But Brer Rabbit kept on gaining, and he darted into some bushes; and when Miss Cow came up, there was he with his head just sticking out, and his eyes looking as big as saucers.

"Hello, Big Eyes!" says Miss Cow, "Seen Brer Rabbit go by here?"

"Just this minute," says Brer Rabbit. "He was looking mighty sick and tired."

Off Miss Cow went like mad, and Brer Rabbit he rolled on the ground and laughed till his sides ached.

THE FABLES OF ÆSOP THE SLAVE

THE DOVE AND THE ANT

One day an ant, when drinking beside the stream, fell into the water, and the current was fast washing her away. A dove, pitying her distress, picked a twig from a neighbouring tree and dropped it into the water. The ant was able to crawl upon this twig, which presently lodged against the edge of the stream, and so she escaped with her life.

A short time afterwards a man with a gun attempted to shoot the dove; but just as he had taken aim and was about to fire, the ant crept up the back of his boot and bit his leg so hard that he gave a sudden start, which caused him to miss his aim, and so the dove flew safely away.

One good turn deserves another.

THE DOG IN THE MANGER

One day a large dog jumped into a manger full of hay, and, finding that it made a nice bed, lay down there to sleep. Presently an ox who was very hungry came up and wanted to eat the hay.

As soon as the dog heard him, it sprang up and barked furiously. The ox again tried to get at the hay, but the dog threatened to bite him if he came near.

The ox then said:

"Why will you not let me eat my hay? It is of no use to you, for you cannot eat it yourself."

"That doesn't matter," snarled the dog. "If I can't eat it myself, I won't let anyone else eat it either."

Selfishness is one of the ugliest faults we can have.

LITTLE STORIES ABOUT FLOWERS

Almost every flower has a story, just as almost every place has a legend, and many flowers have many stories. They are "made-up," perhaps, as the legends are, but they are often very beautiful, and it is interesting to know the stories that have been told for hundreds of years about the flowers that bloom in our gardens still.

THE PANSY

The charming name which many little English country maidens have given to the pansy is Three-Pretty-Faces-Under-One-Hood. The little French country maidens, however, called it Trinity Herb. At first, they say, the pansy had a sweeter and more delicious scent than its little sister, the March violet. It grew in the wheat-fields, and it was much beloved because of its union of beautiful colours and exquisite fragrance, and everybody used to trample down the wheat to get it.

The result was, that when harvest-time came there was no food for the people. This grieved Three-Pretty-Faces-Under-One-Hood, and one springtime she prayed to the Trinity that she might be deprived of her sweet scent, so that nobody would destroy the growing wheat for her sake. Her prayer was granted, and her scent taken away. From that time Three-Pretty-Faces-Under-One-Hood has been called Trinity Herb by the little French country maids.

THE FORGET-ME-NOT

In the morning of the world, an angel was sent on a message to a holy man dwelling in a desert in Persia. But as the angel was flying through the air he saw a beautiful Persian girl sitting by a well-side, and braiding her lovely hair with blue forget-me-nots. He came down and made love to her, and for a while they lived very happily together. Suddenly the angel remembered that he had not delivered the message. He flew back to heaven to ask pardon, but he found that the gate of heaven was closed to him. For a long time he stood by the closed gate weeping, and then the Archangel Gabriel appeared, and said:

"It is ordered that you must people the earth with the Children of the Sky before you can bring a daughter of the earth into heaven."

The angel did not understand what this meant, and asked his beautiful bride if she could explain it.

"Yes," she replied, taking some of the flowers from her hair. "These lovely blue forget-me-nots, which reflect the exquisite colour of heaven, are the Children of the Sky."

So the angel and his bride wandered hand in hand over the earth, and planted forget-me-nots in every country. Then, when their task was ended, the angel took his bride in his arms, and carried her up to the gate of heaven.

THE ROSE

In the days of the ancient gods, there lived in the Greek town of Corinth a lady whose name was Rhodanthe. Rhodanthe was ravishingly beautiful, and her house was besieged by kings and lords, who were eager to win her love.

In order to escape from the throng of her lovers, Rhodanthe fled for refuge into the temple of the white and lovely goddess of purity, Artemis. But her lovers followed her, and the people of Corinth helped them to break open the gates of the sacred temple. Artemis was angered by the outrage, and she changed Rhodanthe into the red rose, which is still deeply coloured with the blush which spread on Rhodanthe's cheeks when her beautiful face was exposed to the gaze of her lovers. The breakers of the temple, on the other hand, were changed into the thorns which now guard the loveliness of Rhodanthe.

THE ANEMONE

There was once a Spirit of the Flowers whose name was Chloris, and the Spirit of the West Wind used to come into her garden and make love to her. The Spirit of the Flowers had many pretty nymphs in her garden, and among them was a little maiden who was called Anemone.

One day the Spirit of the West Wind turned away from Chloris and began to make love to Anemone. This made Chloris very angry, and she drove Anemone out of her garden, and left her to perish in the wild woods.

Happily, the Spirit of the West Wind passed through the woods, and he found Anemone, just as she was dying, and turned her into the little, white, tender, and graceful flower which now grows beneath the trees in early spring.

The next stories are on page 324.

HOW THE GREAT COMMERCE OF ENGLAND BEGAN

When England was still a little-known island, inhabited by rude, unlearned people, there were prosperous empires across the sea, and there can be no doubt that even then travellers from other countries landed on the shores of England, offering goods for sale. In this picture Lord Leighton has painted a company of travellers from Phœnicia, an ancient empire in Asia, offering silks and ornaments in exchange for the skins of beasts, that were almost the only things the poor British had to give.

THE HISTORY OF ENGLAND

WE have imagined what England is like, if we have not crossed the ocean and travelled there. But the country has not always been as it is to-day. We read here what England and Scotland and Ireland and Wales were like when our grandfathers and grandmothers were children; when there was not a single mile of railway in all the land, and only sailing ships at sea; when there were no electric cars, no telegrams, no electric light, and gas was only just beginning. It would be strange now to go back to those old times, and we should hardly know the country if we could see it as it was when the world was seventy years younger. But farther back still, hundreds of years, a thousand years, and even farther back, there were people living in these islands. Who were they? How did they come here? What did they do? The story of these things is the history of England, which we are now beginning.

ENGLAND IN THE LONG AGO

THERE are some stories of which we never tire, and among them are those that we like to hear when we sit round the hearth, and the dancing firelight plays on the faces of those who are our home-makers.

"Tell us again what you did when you were young, or just one story more about what granny did when she was a little girl," is the eager cry. As the stories flow on—for father and mother love to tell as much as you love to hear—the life of the busy homeland of to-day, with the hum of its millions of workers, the clang and roar of its workshops and mills, all seems to be forgotten, as we step for a while into the quiet land of yesterday.

You know the stories? How grandmother, in a large beaver bonnet and silk pelisse, went, when a child, to Ramsgate in a stage-coach; how she slept at Canterbury, because the journey which you now do in two hours took two days. How she and grandfather used to enjoy walking about the sweet green fields and woods, and resting in strawberry gardens near the Crystal Palace or Primrose Hill, where now you see nothing but rows of houses and shops. How grandfather took a whole week in a sailing-boat in rough weather to travel from London home to Berwick. If you have a great grandmother who lived long ago near any of those large manufacturing towns or ports that we have visited, such as Glasgow, Liverpool, Manchester, she can tell you stories of how rivers were deepened and widened, and docks built; how villages grew quickly to be large towns; how quiet country lanes became one wide stretch of factories and cinder-heaps, crossed and crossed by railway lines These stories are as wonderful as those of the magic of the genii who made palaces appear at will. Our genii are coal, steam, and machinery.

We are so accustomed to all the comforts and conveniences in the life of to-day, with our well-paved, well-kept, and well-lighted streets, cheap and quick means of getting from place to place and sending messages, that perhaps we are apt to take them all as a matter of course. But it is not so long ago when there were no telephones, no motor cars, no elevators, no telegrams, no electric light, no bicycles, no railways, no penny post, no gas. As we listen to the stories of life without all these things, and how they all came to be, we realise how times change, and what a contrast there is between our wonderful world to-day and the yesterday which ushered it in.

And what about the times before this yesterday? What happened in them? We can fancy the tide round our shores rising and falling day after day, year after year; the wind passing for ever over the tree-tops, now gently, now roughly; the sun shining on and on, century after century, lighting up the waters of rivers and lakes and colouring the country-sides. But what about the people of the past? We know, in a way, that life has been going on in these British Isles for many years; most likely some great names belonging to them stand out for us. We realise, too, as we look about us or study pictures, that buildings such as Westminster Abbey, the great cathedrals, the Tower, and many now ruined castles and churches scattered all over the country were the work of the men of bygone days.

We can piece together the story of these days which are beyond the memory of living men by looking carefully at the work and relics that have come down to us from them, and by reading in books and letters the descriptions of the times in which their writers lived. Often these writers have copied into their books extracts from the writings of others who lived and wrote long before themselves.

WHAT WAS HAPPENING IN OUR HOMELAND 2,000 YEARS AGO?

By these means we can follow a written history of this country of ours back and back for nearly two thousand years; and it is by this written history that we know what happened through the centuries which we mark A.D. These letters stand for Anno Domini, the year of the Lord; we count our years, as they pass, from the date of the birth of Christ, over 1900 years ago.

The years before His birth we mark B.C., before Christ. Now, if you ask how many centuries there were before Christ, this is what no one can tell you. The great earth-ball on which we live has been journeying round the sun—once round makes one year; a hundred times round makes one hundred years, or a century—for thousands of centuries. No one can say how many, for no one knows when the earth first started on the yearly journey, nor when men first appeared on its surface.

Perhaps you may think the twenty centuries which hold our country's written history a long enough time to look across, filled as they are with stirring deeds and great changes. But if you wish to peer further back, and ask who were the very first men who lived in the country that is now ours, we must go back through ages of unknown length to seek them.

WHEN WILD MEN AND WILD ANIMALS WALKED FROM ENGLAND INTO FRANCE

Perhaps you have noticed how cliffs have been worn away by the sea, a few feet in a year, or you have heard of earthquakes in other parts of the world, raising or lowering whole districts; so you can understand that change is always going on in the shape of the land that rises above the sea. Now, the very oldest things found in this country are some roughly chipped stone tools, which dropped from the hands of the men who made and used them when this island home of ours was not an island, but was part of the continent now called Europe. Wild animals, as well as wild men, could therefore roam about as they pleased, with neither English Channel nor Irish Sea, as they are now called, to stop them. The white cliffs we see at Dover were joined to those at Calais, and the western parts of what are now the countries of France and Ireland showed an unbroken front to the great western ocean. You can judge of the size and strength of the wild animals who left their bones among us by visiting the Natural History Museum, where you can find those of the huge woolly mammoth elephants, of tigers—one of whom has left the mark of his sabre-tooth on the bones he gnawed—of bears, lions, reindeer.

THE FIRST TOOLS THAT THE FIRST WORKMEN USED

The poor, rough tools, shaped like a pear, found in the gravel beds or drift of old rivers, are ranged in numbers round the upper shelves in the Prehistoric Room in the British Museum; it is called prehistoric because the times to which they belong were before written history began. The owners of these tools looked out on a Thames stretching from the heights of Hampstead and Highgate to those of South London. What became of the Drift men, or the Cave men, who followed, we do not know. The Cave men's tools are better made and in greater variety; there are harpoons to catch fish, arrow-heads to shoot birds,

WHEN GRANDMOTHER WAS A LITTLE GIRL

PUNCH AND JUDY IN THE STREET OF AN ENGLISH VILLAGE IN THE DAYS OF LONG AGO

A COACH IN THE FLOODS, SHOWING THE DIFFICULTY OF TRAVELLING SIXTY YEARS AGO

THE KIND OF SCHOOL GRANDMOTHER WENT TO. DRAWN BY THOMAS WEBSTER, R.A.

When grandmother was a little girl there were no railway trains in England, and people travelled in great coaches drawn by horses. It took some days to get from York to London, and travelling was not only slow, but uncomfortable. The middle picture shows how difficult travel was in times of flood. The bottom picture shows us the kind of school grandmother went to in the days when there were no fine schools such as now. The top picture shows the happy side of village life in grandmother's early days, when Punch and Judy came round, and old and young people came out together to see the show which brought them such good fun.

and bone needles to sew skins together, besides the sharp pear-shaped weapons for defence or for hunting.

The most interesting things the Cave men left behind are their drawings and carvings of the animals they saw before them; the great long-haired mammoth as he crashed along, the reindeer fighting, the oxen feeding, are all sketched from nature. Many specimens of these earliest drawings are found in the caves of England and France.

The earth-ball rolled steadily on through space year after year, century after century, and at last, as the ground sank in some places and rose in others, the sea rushed in over the lower levels and formed what is now called the North Sea, the English Channel, and the Irish Sea, and Father Thames shrank to a mere shadow of his former great size. After this men appeared again in this country from over the sea now that it was an island; many different tribes followed each other, the new-comers pushing the others northwards and westwards, even across to Ireland and to Scotland.

NECKLACES THAT WERE WORN IN ENGLAND THOUSANDS OF YEARS AGO

As we look back to the far-off times of these settlers we find them very dark. They have left us no names, no writing. Perhaps the great stones set up at Stonehenge were used by them as a temple; perhaps they were set up about seventeen centuries before Christ. Seventeen centuries B.C. and twenty centuries A.D. makes thirty-seven centuries — 3,700 years—ago!

The long and round grave-mounds, called barrows, still to be seen in many parts of the country are also believed to belong to the peoples of these times. In them are found skeletons and burnt bones, together with the rougher cups and vessels you can see in the museum below the Drift and Cave men's tools. They are headed "Contents of British barrows." Sometimes a little child had a whole barrow to itself; sometimes many people are buried together. The ornaments, brooches, and necklaces found in them will interest us; also the tools of bronze found often in spots where they are supposed to have been made. In these early metal factories lumps of copper and tin, of which the bronze is made, often lie side by side with old tools to be remelted and made into new ones. Then there are iron tools which came into use as time went on and fresh people came to settle in various parts.

We get a few scattered beams of light on these times from the visits of some travellers, who came chiefly to look after the tin found in Cornwall and elsewhere.

THE GREAT LIGHT THAT BEGAN TO SHINE ON THESE TIMES

When they reached home they did what many travellers do to-day: they wrote books about what they had seen. These were copied into other books, and in this way we hear of the barns in which corn was stored, the rich, sweet drink that the natives offered them, and so on. A few centuries later, in the first century B.C., a great light suddenly lit up the country in which we have been groping. By its help we can now see plainly the people who lived in it. They were the children's children of the tribes who settled there from time to time. We call them Britons, and their country is called Britain. Now, whence came the light?

Let us take our map and find the Mediterranean Sea—the sea between the lands of Europe and Africa. The nations who lived on the shores of this great sea were very different from the Britons and other tribes living in the islands set in the wild Atlantic. They traded with each other; some were very learned; some produced the most beautiful temples and sculpture, as well as the bravest men, the world has ever seen. They all believed, however, that the part of the world on which they lived round the great sea was the whole of the world. They did not know that the earth is a ball, on which are the great continents of the Old World, as well as those of North and South America in the New. As we have read in the CHILD'S STORY OF THE EARTH, on page 5, they imagined the earth to be flat, with a great river running round it, and extraordinary were the tales they told of the wild and savage people who lived on the "edge."

THE GREAT ROMAN SOLDIERS WHO BROUGHT THE LIGHT TO ENGLAND

These tales they generally made up; but sometimes, as we have seen, travellers went to see for themselves. Their tales were often wonderful, too!

Now, in the century just before the birth of Christ, one of these Mediterranean nations had succeeded in

THE COMING OF THE ROMANS INTO ENGLAND

THE LANDING OF THE ROMAN SOLDIERS ON THE COAST OF KENT 1,800 YEARS AGO

A KENTISH HILL WHERE THE ANCIENT BRITONS MADE A LAST STAND AGAINST THE ROMANS

Julius Cæsar, a great soldier and statesman of Rome, came to England 55 years before Jesus Christ was born. He did not conquer England; he visited it with his army and described it in books when he got back to Rome. A hundred years later the Romans sent an army to take England, and the Ancient Britons, after driving them back, at last yielded, in a battle which took place on the hill shown in the bottom picture, at Hextable, in Kent, and, little by little, they gained ground, until they settled down and ruled in Britain. Three hundred years later, when the great power of Rome passed away, the Roman soldiers were called back, and Britons ruled their own land once again.

conquering all the others, so that it was master of the whole of the then known world.

This was the Roman nation, and a great Roman soldier and ruler who stands out in this first century B.C. was the light-bearer.

As we study the calm, determined face of Julius Cæsar—his is the first bust in the gallery of Roman portraits in the British Museum—we shall find out by degrees what made him so strong and so powerful. He could make himself do what he believed to be best, as well as he could control others. He was always at work, conquering and settling his conquests, looking after his soldiers, and yet he found time to write books about his travels, which our schoolboys read now when they begin Latin. He gives many particulars about the Britons and their relations, the Gauls, whom he had just conquered. He did not conquer Britain; he visited it with his army two summers running, and described it to the civilised Roman world, who kept it in mind till a hundred years later. Then they were able to send enough soldiers to meet the warriors with faces stained blue to terrify them, to disperse the chariots with scythes on their axles, to take the hill-camps fortified with stakes and logs of wood, and in time to subdue all the country of the plains.

WHEN BRITONS AND ROMANS LIVED SIDE BY SIDE

Little by little, as the soldiers, who had better arms and had been better trained, gained ground, many of the Britons were swept further and further west to the high moors of Cornwall, to the mountains of Wales and Cumberland. It is to these parts we turn, especially to Wales, to find the people whose forefathers were mainly Ancient Britons, and to find echoes of the language spoken by them. It was here, too, that the old religion of the Britons, with the white-robed Druids, lasted longest.

Scattered all over the country, but chiefly in Wales, we find place-names that come from British words meaning a wood, a rock, a plain, an island, a waterfall, and many others more or less connected with the soil. Numbers of the Britons settled down, as time went on, among their Roman masters, from whom they learnt many things. Some helped the soldiers to drain the marshes and cut down trees, and to make the fine roads which crossed the country, and are still a pleasure to use, so well and straight are they laid.

BOADICEA, QUEEN OF ENGLAND, AND THE BRAVE CHIEF CARACTACUS

Two great British names stand out in this first century A.D. Perhaps you know the statue of Boadicea, queen of one of the British tribes, which stands on the Embankment, by Westminster Bridge? She resisted the Romans, who had treated her very cruelly, with all her might, and our picture shows her well in her war car, urging on her soldiers to fight. Caractacus was another great British chief. He not only lost everything, in spite of his brave resistance, but was also taken prisoner to Rome with his wife and children. He did not behave at all as a frightened captive, but proudly, as a free-born king, said to the Roman emperor: "You fight to gain the whole world, and to make everybody your slaves. I fought to keep my own land, and for freedom."

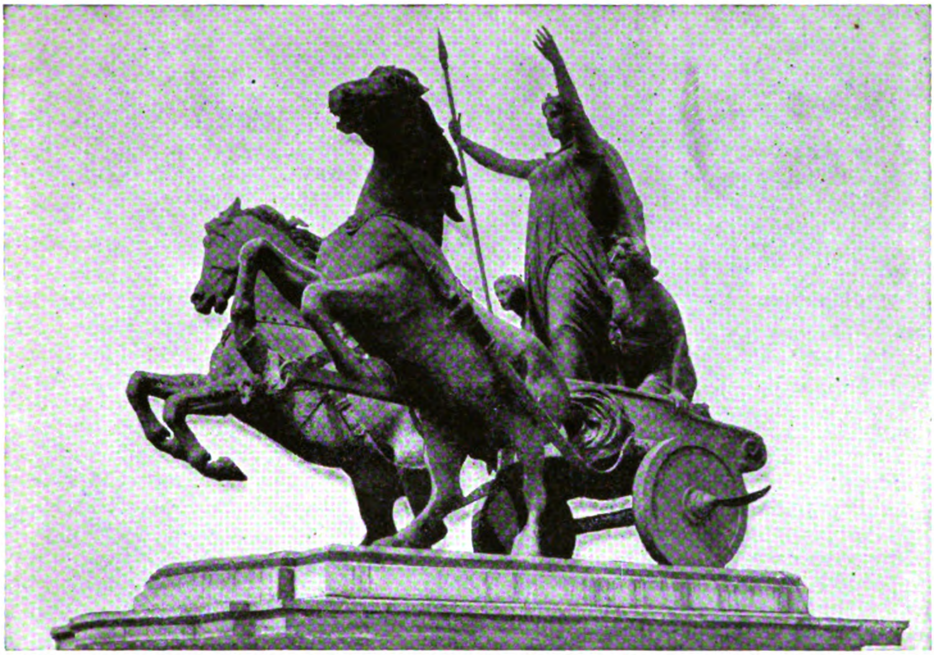
For nearly four hundred years Britain was part of the Roman Empire. Great generals like Agricola came to push the conquests even further; he built a line of forts between the Forth and the Clyde to keep out the wild mountaineers of the north. Are you thinking of that deep, wide valley as it is to-day, with coal and iron mines, factories and ports, fine farms, and thousands of workers?

Emperors came and went; you can see their faces in the Roman Portrait Gallery in the British Museum, and may read their stories of where they stayed, and how they built walls to keep out the fierce Picts and Scots from Scotland and Ireland.

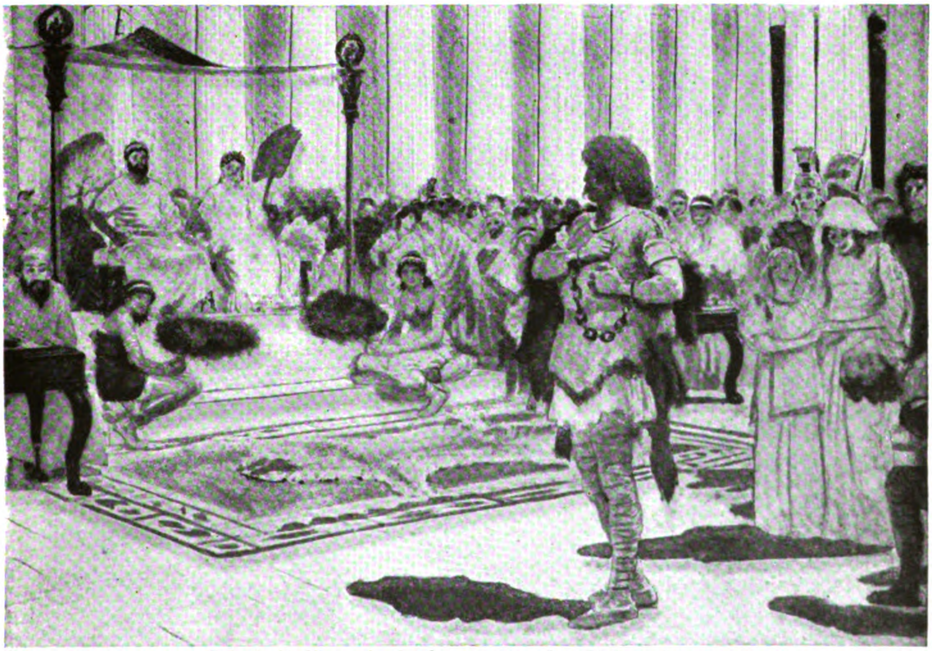
MEMORIES OF THE TIME WHEN THE ROMANS RULED ENGLAND

The remains of the wall between the Solway and the Tyne are still to be seen; a railway runs in that direction now, and the name is still before us when we speak of Wallsend coal, found at the end of the Roman "vallum." Other Roman names on our maps still show where the "cæstra," or camps, were raised to house the soldiers at Chester, Lancaster, Leicester. A "colony" was settled in Lincoln, and many places are called Street, from their

TWO BRAVE CHIEFS OF THE EARLY BRITONS



Boadicea was one of the first queens of the English people. She fought the Romans in the first century and led her people in battle; but the brave queen was defeated, and it is said that rather than be taken prisoner she **slew herself. This statue of her stands at the foot of Westminster Bridge, facing the Houses of Parliament, in London, and on it are the fine lines "Regions Cæsar never knew, Thy posterity shall sway"; meaning that Boadicea's country should grow greater than Rome. This has come true, for Britain is now greater than Rome.**



Caractacus was a great British chief living in the first century after Christ—about 1,800 years ago. He lost everything in fighting to drive out the Romans, and was taken prisoner to Rome with his wife and children. **There he was brought before the Roman emperor, as shown in this picture, but he was not afraid. "You fight to make everybody your slaves," he told the emperor who ruled almost all the world; "but I fight for freedom."**

position on or near the great "strata," or roads. Stratford is an example of this.

The thousands of soldiers who came during these centuries from every part of the empire—the British lads were sent just as far away—left many remains on the soil of the country in which they worked so hard. Many of these remains are now in the great museums of the country, especially in the cities founded by the Romans—in London, York, Colchester, Winchester, and Bath. There are the altars they set up to their gods; their weapons and armour; the tablets to show long and faithful service, which gave them their discharge from the army; the memorial stones put up to honour their memories.

Many treasures of money and jewellery, perhaps buried in a hurry when danger arose, and never reclaimed, have been found among the foundations of cities, along the line of the walls, and on the sites of the beautiful country villas. These were built in the sunniest and healthiest positions, generally with a fine view, amidst gardens with fountains and statues

LIFE IN THE CITY THAT LIES BENEATH LONDON

We can well picture the life in these villas, as we look at the fine pavements, the shoes of the ladies and children, the lamps, writing materials, mirrors, and other treasures found buried amongst their ruins. Some of the pottery and glass were made in Britain, for the Britons were quick to learn, but most of the finest came through London.

London rose to be an important city in Roman times. Some twenty feet below the pavements of the City of to-day, so thronged with busy feet, we find the remains of its greatness. The strong walls built for its protection ran, to some extent, on the lines of the Underground Railway. Perhaps you have noticed how many stations on it have the word "gate" in their names—Aldgate, Moorgate, and so on, and from these gates in the walls started the great roads which passed over the country—something like the great main lines of railways at the present time—to connect the City with their stations at Lincoln, York, Chester, Bath, Chichester, and many others. Traders, therefore, found it a convenient spot to bring the goods they had for sale, especially as there was then, and for many years after, a short cut for their ships from the Channel by the streams that made the Isle of Thanet really an island.

PIRATES FROM OVER THE SEA CAME TO ENGLAND IN BOATLOADS

Some time, perhaps, in the third century Romans, as well as Britons, began to give up worshipping the gods of their fathers, and listened to the preaching of Christian missionaries; so there presently arose British churches and bishops. The country improved in many ways—more corn was grown, trade increased, and it seemed as if Roman law and order, and the liking for fine and comfortable lives, had all come to stay.

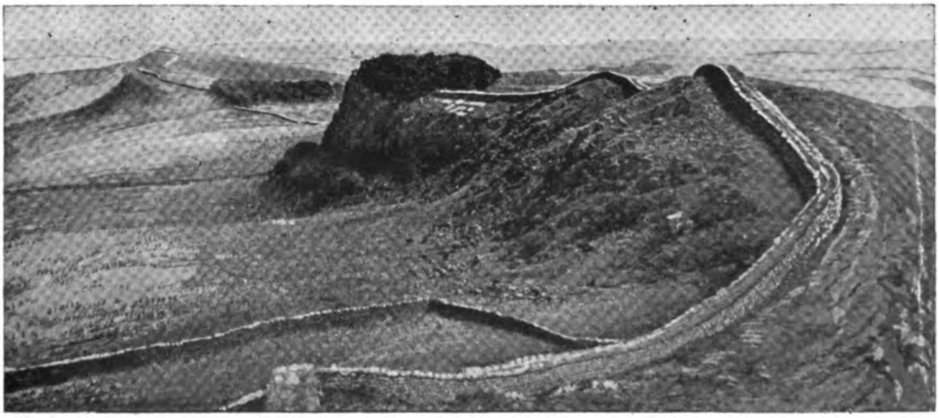
But this was not to be. In Britain itself troubles thickened as the Picts and Scots became more and more daring, and pirates from over the sea landed on the east and south coasts. Year by year, as the spring came round, fresh boatloads landed on the most desirable spots they could find, and took by force whatever they needed. In other parts of the great empire troubles thickened too, as fierce tribes poured over its distant borders and made their way towards the beautiful and wonderful capital itself. The only thing to be done, as the empire grew weaker and weaker, was to give up the most distant provinces and recall the soldiers who held them to defend those nearer its mighty heart.

THE ROMANS LOST THEIR POWER & LEFT THE BRITONS TO RULE THEMSELVES

So they had to leave the walls they had built, the cities and camps, with the theatres and baths, the castles—such as those at Richborough and Reculvers, which guarded the way to London when "Thanet was full isled." There must have been many a sad good-bye, for often Romans had British wives and relations, and the departure of those who had helped to make the country so prosperous must have sown despair in the hearts of those left behind to cope with the difficulties and dangers as best they might. They had so long been taken care of that they had forgotten

ROMANS BUILDING A WALL ACROSS ENGLAND

THE ROMANS AT WORK ON THE WALL THAT KEPT THE PICTS AND SCOTS OUT OF ENGLAND



THE REMAINS OF THE ROMAN WALL ACROSS ENGLAND AS SEEN TO-DAY IN CUMBERLAND

The Romans, when they ruled in England, 1,800 years ago, built two great walls in England and Scotland to keep out the men who were always fighting with them, and the walls are still to be seen in parts of the North of England. The wall across the North of England stretched 70 miles, from the mouth of the River Tyne to the mouth of the River Solway; the wall in Scotland was smaller, reaching from the Firth of Clyde to the Firth of Forth.

how to make plans for themselves and fight altogether.

Listen to a letter they sent to Rome, asking for soldiers to come back and help them; it is so sad that it is called "the groans of the Britons." "The barbarians drive us to the sea; the sea drives us back to the barbarians. We are either slain or drowned." Many sad relics of this time are found in the caves, where families took refuge when their homes were destroyed. Thus it was that the light shed over Britain by the presence of the civilised Romans went out as the last boats carried away the last soldiers across the Channel.

The wild Picts and Scots burst over the now undefended wall, and burnt what they could not carry away back to the hills; the sea-rovers, who had been coming year after year to settle and stay, came ever thicker and faster. They burnt the villas and towns, destroyed the camps, starved London to death because trade was stopped, and provisions could no longer come in by the land and water-gates from the roads and the river.

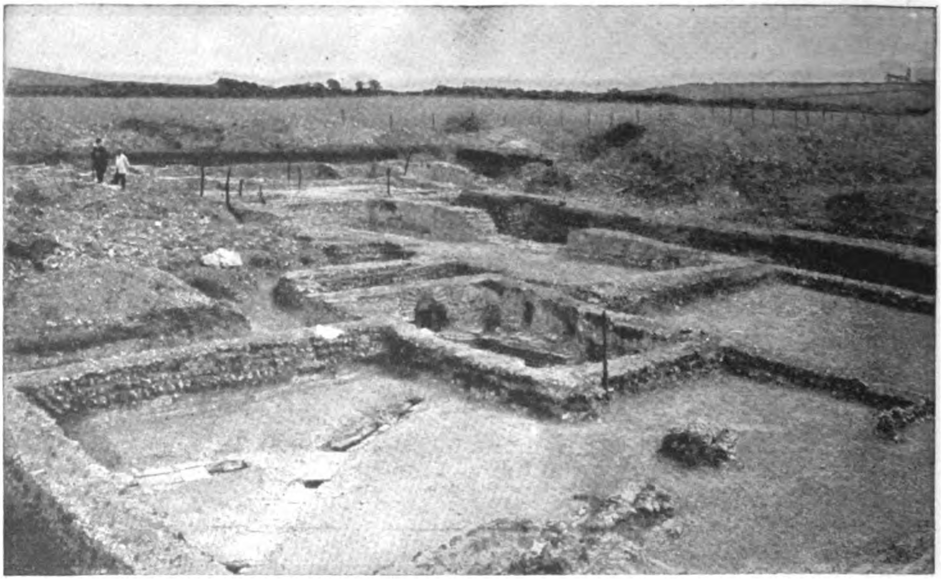
Once more Britons had to flee to the mountains in the west, and those who were left behind became the servants of the heathen new-comers, if they could not manage to stay on in their farms as owners.

We want to find out all we can about these new-comers, for it is they who are the forefathers of our race. Great changes have taken place, as many generations have been born, have lived and died, during the fifteen centuries between their time and ours. But still, as a nation, we keep up a family likeness, and in many ways take after our great-great-grandfathers. Many of us are as fair-haired and blue-eyed as they were; we love the sea and adventure, though in a quieter way, as much as they did. Half the words in our language—all the everyday words—come from the speech in which they shouted directions to each other as they shipped their oars and grounded their boats on these shores.

Besides all this, and much more, most of our laws, our ways of governing, our customs, have grown, through the centuries, from those they brought with them, together with the passionate love of freedom which we inherit from their old homes across the North Sea.

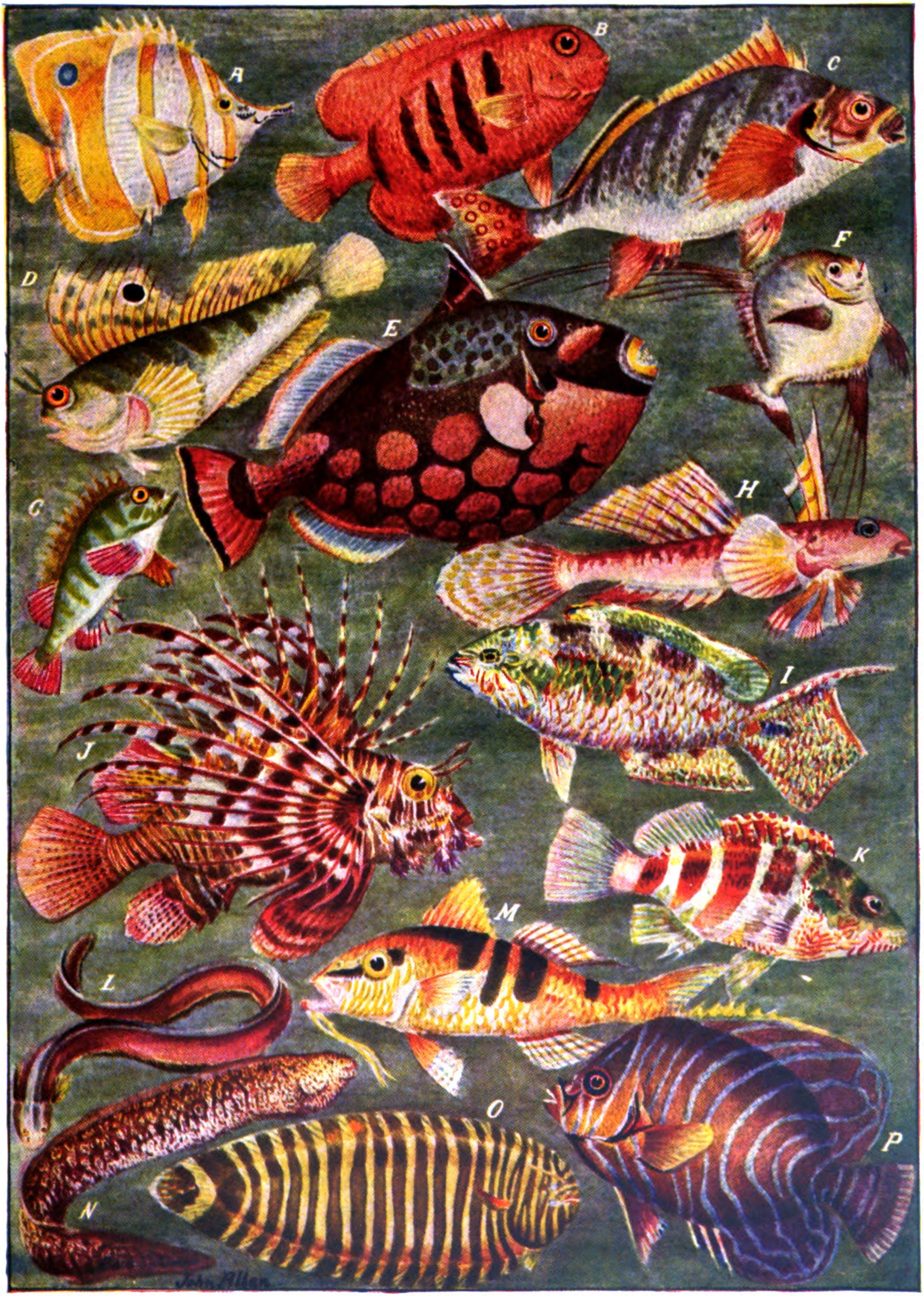
Continued on page 427.

THE RUINED HOUSE OF A ROMAN GOVERNOR, HIDDEN UNDER A PLOUGHED FIELD IN KENT



Under the surface lie remains of Roman England. We see in the museums parts of beautiful floors that have been dug up from the ruins of houses in which the Romans lived in England nearly 2,000 years ago. This picture shows the ruins of a Roman governor's house buried in a field on the banks of the River Darenth, in Kent.

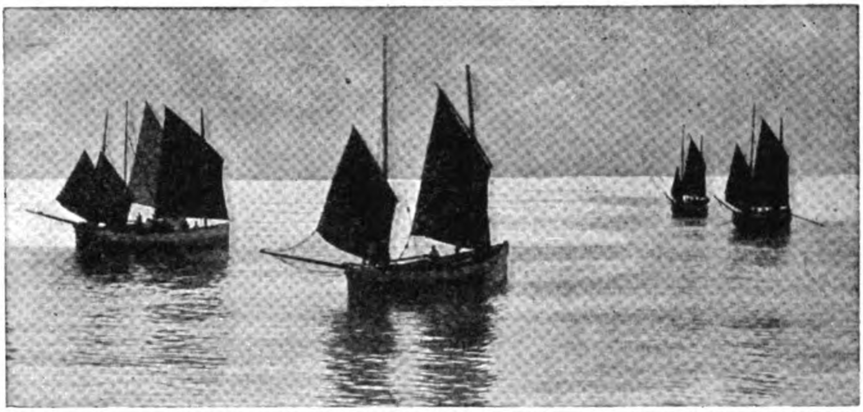
FISHES IN THEIR NATURAL COLOURS



Some of these fishes have no English names, but these are the names by which they are known to all Natural History students.

A. Beaked chetodon
B. Scarlet holocanthus
C. Banded chilodactyle
D. Eyed blenny
E. Trigger-fish
F. Cobbler-fish
G. Red-finned apistus
H. Japanese dragonet
I. Two-spotted cheilinus
J. Fire-fish
K. Banded paracirrhites
L. Electric eel
M. Many-banded mullet
N. Murena
O Zebra sole
P. Semicircular chetodon

As we see from this picture, fishes vary very much in colour, and some are quite bright and gaudy. They are not the same colour all the year round, but, like the birds, they put on their showiest and smartest dress in that season of the year when they are looking out for mates.



SMALLER FISHES OF THE SEA

CONTINUED FROM 142

In no other form of life do we see the struggle for existence more keen than in the sea. Nearly all the fish are fish-eaters. Big fish eat lesser fish, and the smaller ones eat others still less in size. Life is one long battle for food, and fish's food is for the most part living animals. After all, the conditions in this respect are not so vastly different from those on land. The carnivorous animals cannot eat anything but flesh; the birds of prey must have flesh for their support; the insect-eating birds must kill lesser living things for *their* support.

In a single mouthful a big hungry fish can swallow enough tiny fish to populate a whole sea. Therefore, if the various species of fish are not to die out, their families ought to be very numerous. And we find that that is so. It is really necessary that their numbers should be cut down, or the waters would not hold them all. We shall come to some startling figures in the insect families, but those of the fishes almost take away our breath.

Think what would happen if all the eggs of all the fishes hatched and all the little fish grew up! The common herring lays about 25,000 eggs; the lumpfish about 155,000; the big halibut lays about 3,500,000 eggs, which, considering the enormous number, are large eggs; the codfish lays over 9,000,000, while the ling lays about 150,000,000. Three healthy ling would lay more eggs than there are people in the whole of the vast British Empire. Now, unless there were severe checks, these numbers would speedily fill the seas, so that, though it is hard for those that suffer, it is necessary for the others that the numbers of fish should be reduced.

The people who like caviare will not thank the fishes which make their dinners of the eggs or young of the sturgeon. Caviare, which is a form of Russian food sought after mainly because it is so costly, is made from the roe of the sturgeon. The flesh of the fish is not of much account where its roe is chiefly desired. In England, however, people long ago made up their minds that the sturgeon is a luxury, and Edward II. greedily decided that any sturgeon caught in English rivers should be his. It is always called the royal fish in England, and even to-day, were one caught in the Thames, it would legally belong to the Crown, though of course the king would not allow it to be claimed from the man who caught it.

In America sturgeons are well-known and eaten, but no caviare is made. They go up rivers to lay their eggs. The river Volga is famous for its sturgeons, and it is from the fisheries there that most of the caviare comes. The air bladder of the sturgeon is made into isinglass. A piece of this bladder, if put into a hundred times its quantity of water, will turn the latter to a jelly. In structure the sturgeon is notable for the bony shields with which it is armed. It has a long snout, with which it roots in the mud and sand for worms and other food. Its mouth is underneath, and is equipped with finger-like feelers, with which it picks out its food.

Isinglass is made from the air-bladder of the cod also. But that is of minor importance in regard to this fish. The cod is of great value as a food supply, while it yields an important medicine-food—cod-liver oil.

FISH THAT HAVE PROVIDED FOOD FOR A COLONY FOR 300 YEARS

Codfish are to be found where the herring shoals are, and swarm in enormous numbers off Norwegian coasts, in the North Sea, and to a still larger extent off Newfoundland. Codfish first established the importance of Newfoundland, Great Britain's oldest colony. There, for more than three centuries, fishing has been the chief occupation of the people. Thousands upon thousands of men depend for their living upon the cod-fishing, and almost as many women and children help in the curing of the fish.

Not nearly all the cod caught could be at once eaten; the greater number of them are salted and sent to various parts of the world to serve as food long afterwards. The average cod is from 2 feet to 4 feet in length, but some of them weigh 100 pounds.

It is to the banks of Newfoundland that most of the American fishermen go each year to get the vast supply which is needed for the people of the United States. These banks are ridges in the ocean where the water is only a few hundred feet deep, and where the cod assemble in great numbers in winter, feeding largely on the clams which swarm on the bottom, on squids, and small fish. This is the season of cold and storm, but hundreds of hardy men go from Gloucester, Marblehead, Portland, and other towns in New England, and in the Canadian provinces, in swift little vessels, and set their trawls, often when gales and snow make the sea tempestuous, and the air freezing cold. These trawls are long lines anchored at each end, and held up by buoys, to which are fastened every few yards other lesser lines, with baited hooks. which hang far down in the water. The cod seize the bait on some or all of these hanging hooks, and get caught. A few hours later a couple of men in a little row-boat, called a dory, go out and haul up the trawl, take off the cod that have been captured, rebait the hooks, and return to their ship. But often a fog or a snowstorm comes up to hide them from the captain's sight, and many a dory and its men are never picked up at all. These fishing-vessels are splendid sea-boats, and it is from them that our swiftest yachts have been perfected. Yet many are lost, and no occupation requires more courage and endurance than that of these fishermen.

The common Atlantic cod is probably the most important of the sea fishes in respect to the United States; yet it is not the only one of this valuable family, for several of its relatives are caught for food, and eaten fresh or salted or dried. The big hake is one of these; another is the haddock. In Scotland the favourite breakfast fish is the whiting, a capital sort of cod-fish, which, unfortunately, does not live on the western side of the Atlantic. There are good codfish in the North Pacific, too.

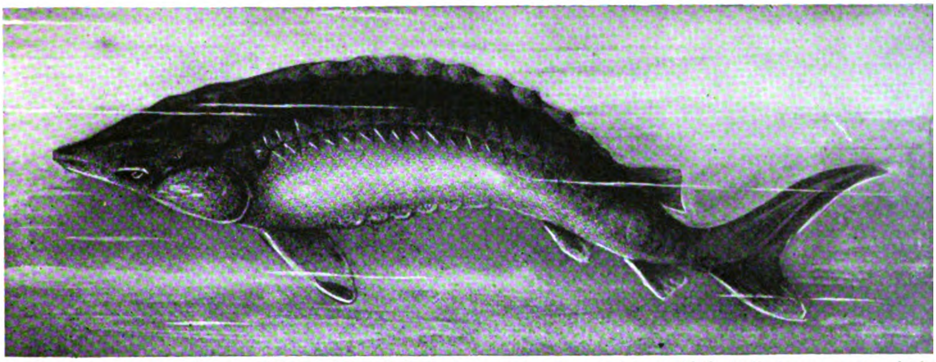
THE NET THAT CATCHES THE MACKEREL, ONE OF THE SWIFTEST FISH IN THE SEA

Our American fishermen catch mackerel and herring, too; but the most important, interesting fisheries for these fish are in Great Britain.

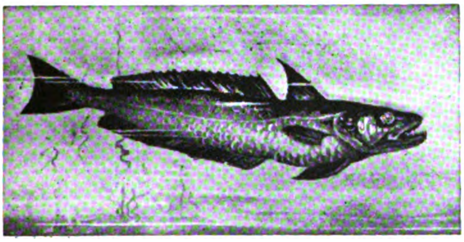
The mackerel is one of the fleetest swimmers in the sea. It is beautifully built for swimming, and has wonderful muscles, which give it both speed and strength. Countless moving swarms of mackerel are to be met. They lay their eggs on the surface of the water out at sea, but at certain times of the year they come into the shore.

The reason is that they follow the herrings, pilchards, and sprats, on which they feed. It is then that the fishermen net them. The nets are floated in the water, hanging straight down, like walls of thin cord. Owing to the colour of the nets the mackerel cannot see them, but dash straight at them. Their head enter the meshes, but the latter are too small for the thick part of the body to pass through, and the mackerel

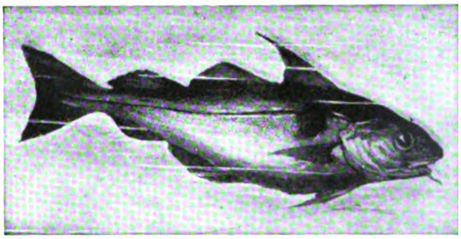
A ROYAL FISH IN GLISTENING ARMOUR



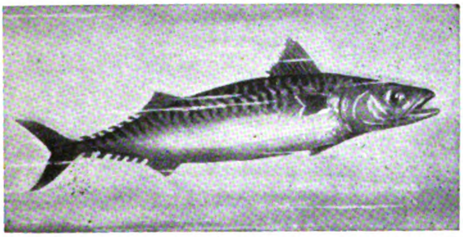
The sturgeon is called the royal fish in Great Britain, because long ago a king said that all sturgeons caught in England should belong to the Crown. It is a handsome and splendid fish, covered with glistening scales of horny plates. In Russia, where it is very abundant, the sturgeon is chiefly valued for its roe, which is made into caviare.



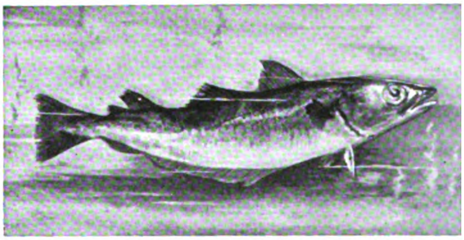
The hake belongs to the cod family, and eats herrings.



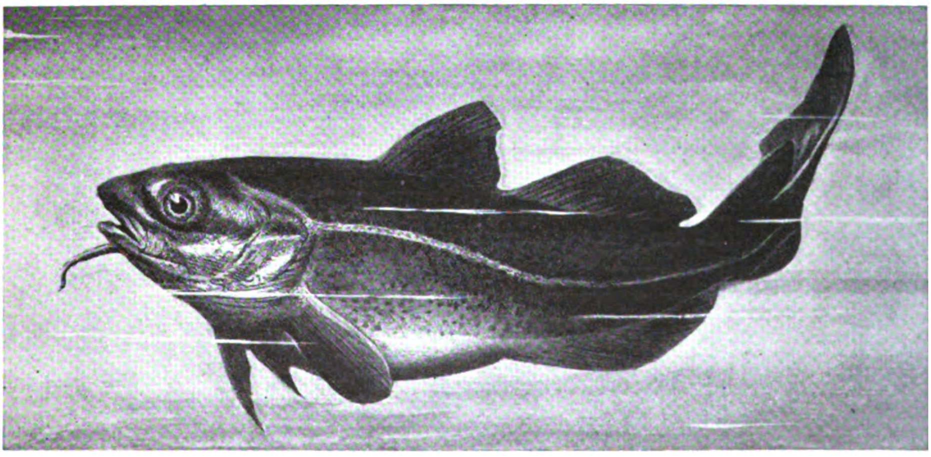
The haddock is a smaller member of the cod tribe.



The mackerel is one of the strongest and swiftest fish in the sea, and perfectly shaped for speed and endurance.



The whiting is a member of the cod family. It is caught largely round Plymouth, on the English coast



The cod is one of the most important fish of the northern seas. Newfoundland, Great Britain's oldest colony, depended for a long time upon the cod-fishing for its prosperity. The fish was so important to the people that they used to salt the flesh and give this in payment for other things, making it serve the purpose of money.

finds its gills entangled in the netting. A million of these splendid fish were caught during a single week by the fishing boats of Newlyn, near Penzance.

A FISHERMEN'S HARVEST OF FIFTY MILES OF FISHES

The fishermen, on getting out of harbour, found what they called a sea of mackerel, measuring fifty miles round. These sound very big figures, but we must remember that the harvests of English and Welsh fishermen amount in a year to 500,000 tons of fish in some years, and the value of the fish taken to more than 30 million dollars. Those figures do not include the millions of all sorts of shell-fish caught. Neither can they include all the fish brought into the smaller ports. Thus we may see that the fish round our coasts are very important to the food supply and wealth of the country.

The herring is among the fish which yield the fishermen the greatest harvests. Its very name means multitude, for it comes from a German word signifying an army—an army of fish. It is a beautiful fish, with which we are all familiar, so there is no need to describe its appearance. But its habits repay study. In spite of the vast numbers caught, the herrings were themselves a great mystery to us for ages. Men believed that the fish congregated in their millions of millions in the cold waters of the frozen north, to which men could not go; then, at certain times of the year, obeyed the call of Nature to come to warmer latitudes, as if to offer themselves as food for men. We know now that the herrings do not come from the north.

THE GREAT ARMIES OF HERRINGS THAT COME AND GO IN THE SEA

They have their constant home in the waters off our own coasts, in the German Ocean, in the Baltic, and elsewhere. It was believed that the great armies coming down from the north broke up into smaller contingents, calling at various parts of our coast, from the extreme north of Labrador down to Virginia. That, however, is not the case. They come in from sea in straight lines to the spots off our coasts where they wish to lay their eggs. Every year numbers of Scottish girls go from point to point of the coast, staying a week or so here, and a week or so there, to cure the herrings which are caught at each place in turn. They say that they are following the herrings from north to south. They are not; they are meeting the herrings as they come in from the sea. There are acres and acres of spawning-beds on our coasts to which the herrings go year after year. The eggs are laid in myriads among deep rocks, where they cannot be trawled up and destroyed by the nets of the fishermen. It is a good thing that the eggs are so numerous, and laid far from the reach of men, for the herrings have many enemies; such fish as haddocks eat enormous numbers of the herrings' eggs. But one of the wonderful things in Nature is that, where fish eggs are greatly sought as food by other fishes, the fish which lays them provides very large numbers. Where the eggs are few, the fish guards them; where they are many, the fish leaves them to their fate.

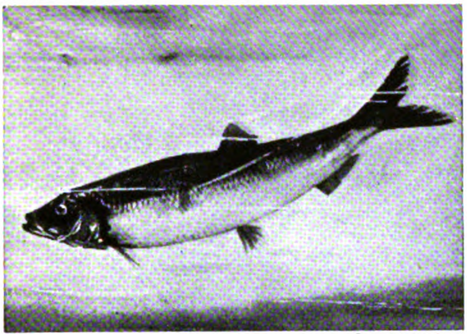
HOW THE HERRING HAS HELPED TO MAKE TOWNS RICH AND PROSPEROUS

The herring grows rapidly, but it does not attain full size until about two years old. When still quite small, it is caught and served up as whitebait. The flesh of the herring itself is excellent food, and someone has wisely said that if these fish cost a dollar each they would be prized as among the finest of fish.

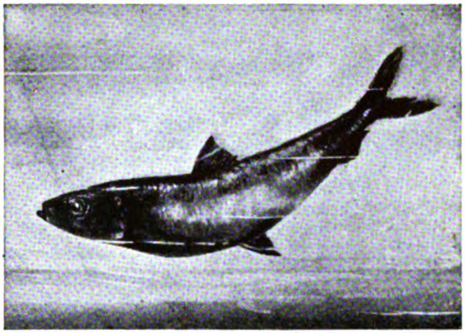
Though we are able to trace them in the sea with sufficient accuracy to enable us to telegraph to the fishing fleets where to steer for, the herrings do not always go to the same grounds. In the Baltic Sea, in which they used to swarm, there are not nearly so many as there were, and those remaining are smaller than the rest of the family. The Baltic is becoming less and less salt, and therefore the fish desert it or, if they remain, do not attain to much size and strength.

Many changes in the herring's travels have been noted in the course of history. Towns grew prosperous upon the harvest of herrings—Amsterdam, in its early stages, was built up very largely upon money made by the fishers of the herrings—and towns have declined when the herrings have changed their quarters. For ages the herrings used to teem at certain times of the year off the south coast of Sweden. Then they suddenly deserted it, and not a herring was seen there for seventy years. A

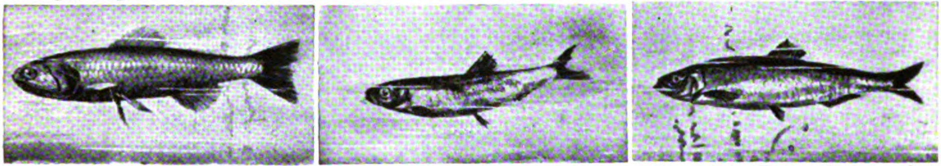
FISHES WITH EYES THAT CHANGE PLACES



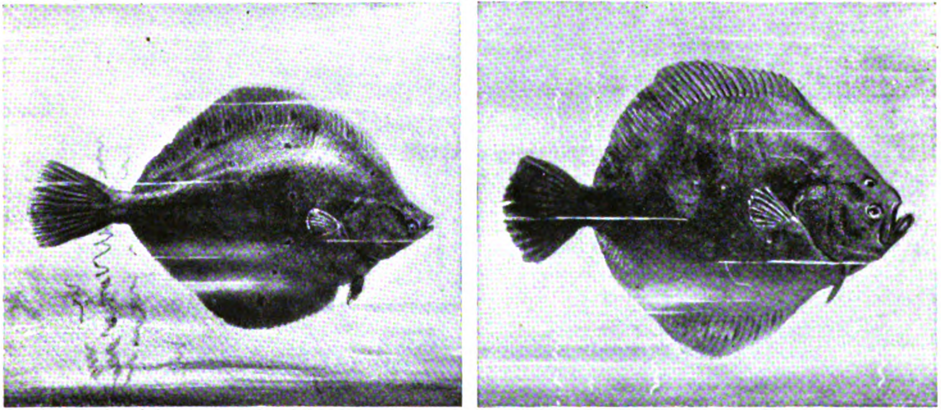
Herrings are among the most numerous fishes of the sea. Cities have risen on the money gained from herring fishing, and declined when the fishing failed.



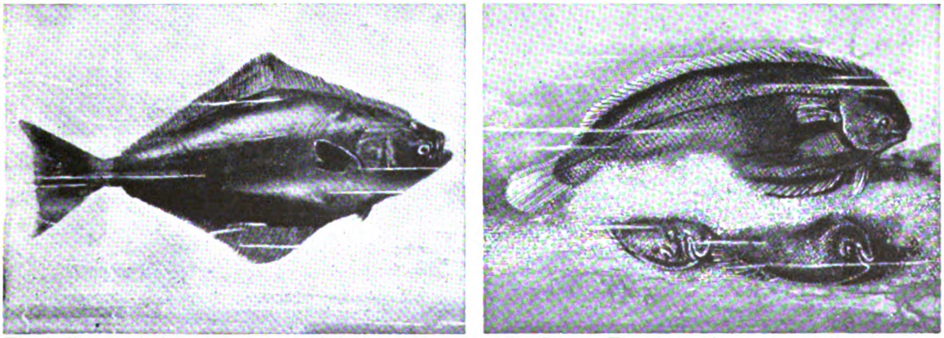
The pilchard is a relative of the herring, but thicker and shorter. As it grows up the pilchard loses its teeth. When young, pilchards are sold as sardines.



These three fish, the sardine, the whitebait, and, on the right, the sprat, are all related. The sardine was first called the Sardinian fish, but nowadays young pilchards and little herrings and sprats are preserved in oil and called sardines. Whitebait are young herrings or young sprats. They are plentiful in the Thames, and in other days statesmen used to go to Greenwich for whitebait banquets as they now go to the Lord Mayor's feasts.



On the left the plaice, and on the right the turbot, represent the strange flat-fish family. They are formed like other fish when young, but as they grow older they undergo a strange alteration. The body is flattened, and the left eye travels round one side of the head, to be on top of the head like the right eye, so that the fish may see upwards with both eyes. Young flat fish live out at sea. Old ones prefer the sandy bed of shallow seas.



The halibut and the sole are two of the most important flat fishes. They have the same peculiar structure as the plaice and turbot. Their under side is really the left side, and the upper side is the right side. When at rest they lie perfectly flat, with the left side underneath, and that side, receiving no light, has no colour.

few years ago they returned, and the fishing industry has since then revived.

Sprats, shads, and sardines belong to the herring family. The sprat is so much like a small herring that only the trained eye of the expert would discover the differences which exist.

THE LITTLE MEMBERS OF THE HERRING FAMILY THAT HAVE MANY NAMES

They are treated as common food when sold as sprats, but when given the name of anchovy or whitebait, or served up in oil as sardines, sprats fetch a high price. The herrings come near land to lay their eggs; the sardines go out from the coast and lay theirs on the surface of the deep sea. So does the pilchard. This latter fish, off the English coast, reaches a length of 10 inches, and forms an important item of food, especially to those people in the Mediterranean countries, to whom it is sent salted in great barrels. Many fish that we call sardines, which come to us from France, are really young pilchards, which have been preserved in oil. Cornwall fishermen now can the young pilchard, and Kentish fishermen can the little sprat, and sell them as sardines—a name which meant, when first given, " the Sardinian fish."

Plaice, which is a famous European flounder, feed many other fish with *their* eggs. They lay their eggs out at sea. The tides carry the eggs towards the coast. As they travel, the eggs, if they escape other fish, develop, and the young fish hatch out as they reach the spot in which to make their homes.

THE WONDERFUL WAY IN WHICH THE FLAT FISHES BECOME FLAT

They now sink to the bottom of the sea, and undergo a most wonderful change. At first they are little ordinary-looking, thin fish, swimming in a vertical position, as other fish swim. At the end of the first year they are only from 2½ to 4 inches in length. In the next year they grow a couple of inches; but in the third year their size doubles, and they now become a foot long.

At four years of age they are from 14 to 20 inches long. But, in the meantime, they have wholly changed their appearance. Instead of swimming vertically, they now swim flat; they have become broad and flat. The eyes, instead of being upon the two sides of the head, as in other fishes, have changed their relative positions, so that both eyes are now *on top* of the head. One eye has travelled round, so that the plaice can see upwards with both eyes.

This is one of the most striking evidences of the way in which changes come about in animal life. There is no doubt that the flat fish were, once upon a time, shaped like other fishes; but now when they grow up they have the left eye on top of the head, in a line with the right. This is not the only strange change. The upper part of the fish becomes coloured like the sand or mud in which it makes its home, while underneath, where there is no light, it is white. Thus it can approach living prey without being detected. We know that if the flat fish were exposed to light on the under side they would become coloured there, too. An interested gentleman once tried the experiment.

He put some flounders, which, with the turbots and soles, belong to the same family as the plaice, into an aquarium. But the floor of the aquarium he made of a big mirror, so that the light which entered from above was reflected upward again by the mirror at the bottom. The experiment lasted some months, and at the end of that time some of the flounders had become coloured underneath as they were on the back.

FISHES THAT LAY MILLIONS OF EGGS AND FISHES THAT SWIM HUNDREDS OF MILES

The sole is the most prized of the flat fish; the turbot comes next in cost; brill is another favourite; so is the halibut. This fish, which is caught in the North Atlantic for the American markets, has been known to grow to a length of 20 feet, and to weigh 500 pounds. The halibut of even moderate size lays about 1,300,000 eggs, though the biggest lay three times that number; the brill lays about 325,000, but the turbot lays 14,000,000. The flat fish swim by a gentle undulating motion of the body. A plaice was marked and turned loose in the sea. Three months afterwards the same plaice was caught after it had swum to a spot 173 miles away. Other marked plaice have swum at the rate of a mile an hour.

The size of the halibut reminds us that among the fishes which we consider the smaller ones of the ocean there are some really big ones. There is another big fellow in the tarpon, the giant of the herring family, which measures 6 or 7 feet, and weighs from 100 to 200 pounds. When caught on a hook it makes prodigious leaps in the air clear of the water. But it cannot, in this respect, match the flying-fish. This is a beautiful creature of the southern seas, about a foot in length, .armed with a greatly extended tail and huge fins, which serve it almost as. wings.

A FISH THAT USES ITS FINS FOR WINGS AND FLIES OUT OF THE SEA

These fins are compressed in the water. When the fish, either with a view of escaping from an enemy, or a desire to fly, determines to leave the water, the fins spread out like parachutes, and the fish at the same time inflates its air-bladder and air-sacs in its gills, and away into the air the flying-fish goes, higher than the masts of a ship. Some people say that this cannot be called flying, but Mr. Bullen, who has so often watched them, declares that the fish truly flies. The wings do not flutter like those of a bird, but vibrate like those of an insect. Just as the fish is about to enter the water the gaping jaws of a dolphin may await it, but the fish sees its danger, rises again into the air and flies away, just as it did before. These fish fly 1,000 yards, says Mr. Bullen, and they only cease flying when their fins become dry and stiff.

The flying-fish is much prized for food at sea by sailors; but the fish has other enemies in the air and water. There are the seagulls above, there are the dolphins and tunnies below. The tunny is another of the big smaller fish. It may be anything between 6 and 10 feet, and its weight up to half a ton. It swims with precision to the spot which it knows the flying-fish will touch on returning to the water, and, if the fins be dry, down the tunny's throat goes the poor flying-fish.

A FISH THAT RIDES THROUGH THE OCEAN ON THE BACK OF A SHARK

The tunnies have some strange relatives called sucking-fishes. These latter have on their backs, extending back from the head, a wonderful sucking apparatus. Boys who have made leather suckers know how these work, and how strong a tug is necessary to pull up even a small one. Well, the sucking-fish's plates are still stronger, and once the fish has attached itself to an object it cannot be pulled off; it must be drawn sideways. Sharks are the fish to which sucking-fishes generally attach themselves, though sometimes they mistake a ship and fasten on to that, and go careering over the ocean, getting plenty of food on the way. Sometimes, too, they will cling to a turtle. Natives of Zanzibar and other places take advantage of this habit of the sucking-fish. They catch the fish, and, when they see a turtle in deep water, let down the sucking-fish on a line on to the turtle's back. The fish instantly grips the turtle and both are pulled up together, to the turtle's great surprise and indignation.

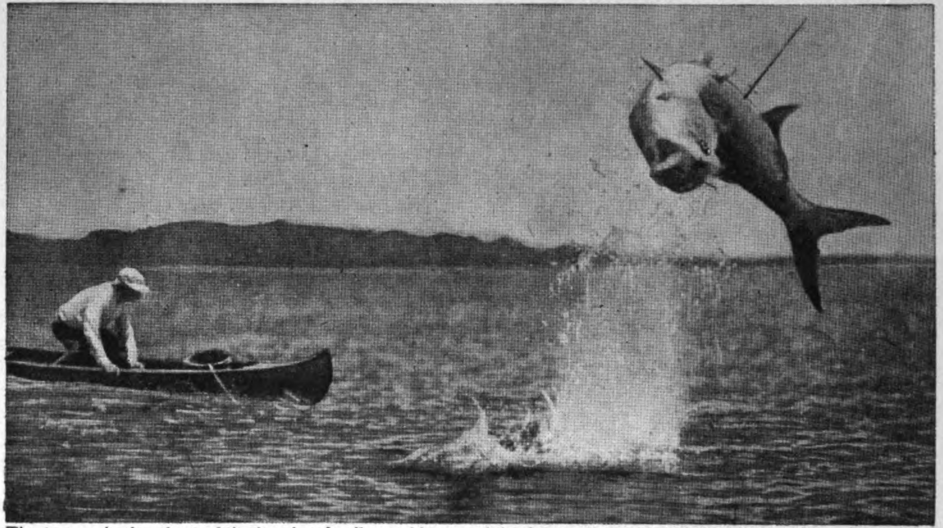
But this is not the only fish which bears the shark company. There is another, the pilot-fish, a famous little fellow. In olden times people believed that the pilot-fish used to guide and protect ships. He would swim before the ship when all was well, but would disappear, they said, if rocks or land were near, so as to warn the sailors of the danger of their running aground. It is a fact that the pilot-fish swims with ships and sharks, but it is not with any intent to guide or protect.

THE FISH THAT PILOTS THE SHARK TO FOOD AND SOMETIMES TO DEATH

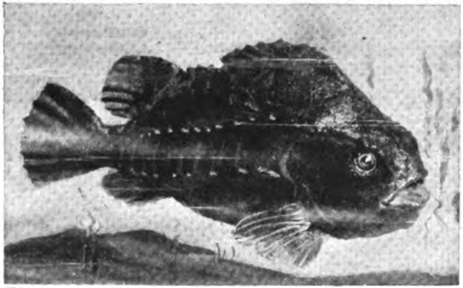
When swimming with a shark, the pilot-fish keeps just ahead, and if he finds food, dashes about and flops his tail on top of the water to attract the shark's attention. Then, when the great fish comes up, he shares the meal with it. But often, when sailors throw a baited hook over the side of their ship, the pilot-fish will lead the shark to that and see it caught and hauled on board. The pilot-fish is about a foot in length, and striped with bars of a darker colour upon a ground of blue.

If we consider the pilot-fish the shark's huntsman, we come next to a huntsman of a very different sort, the huntsman who shows, perhaps, more skill than any other fish in obtaining his food. This is the angling-fish, or fishing-frog, or sea-devil, whichever we choose to call it. It is an ugly creature, with a frightful mouth armed with rasp-like teeth, and, as it attains a length in some waters of 5 feet, it is naturally a terror to smaller fish. But, as it moves very slowly, it has to resort to trickery. It walks along the bottom of the sea on its two broad fins. With

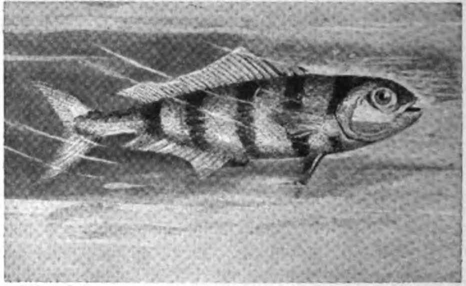
FISHES THAT HUNT IN THE SEA



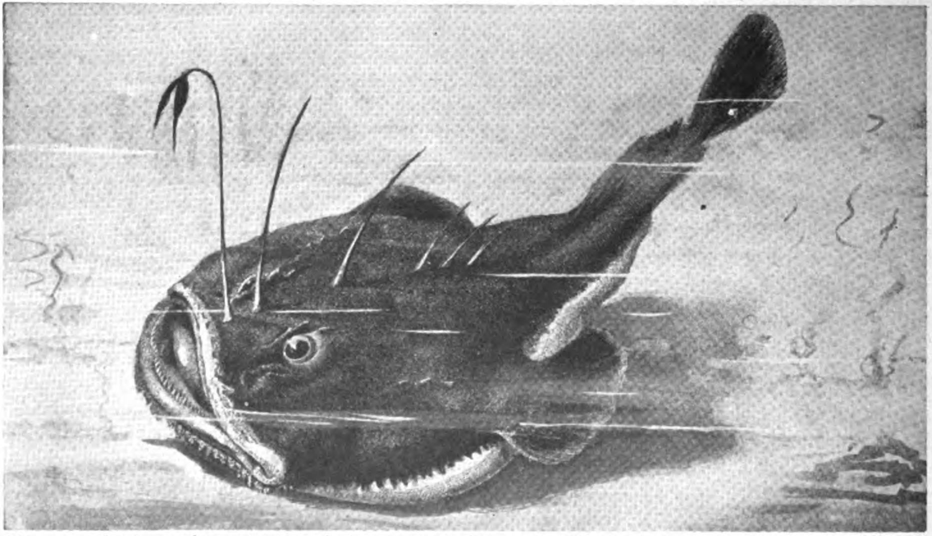
The tarpon is the giant of the herring family, and is one of the fishes upon which sharks feed. When hooked by fishermen the tarpon tries to escape by leaping into the air. Sometimes the shark seizes the tarpon as it descends.



The lump-sucker, though a good swimmer, likes steady rest, and sticks to rocks by means of its sucking disc.

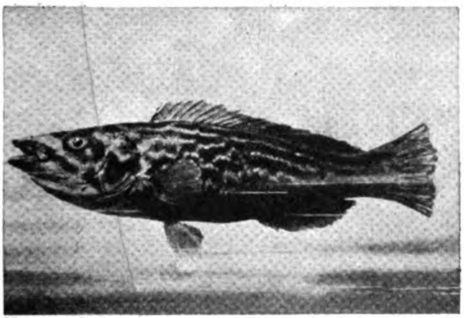


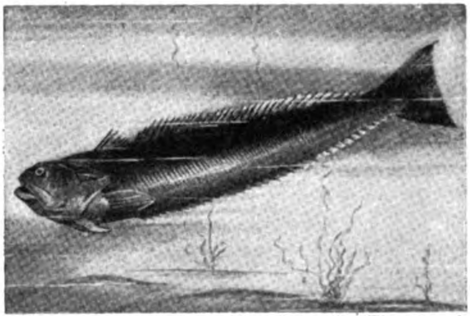
Pilot-fishes swim near ships and sharks, and sometimes lead the latter to death by finding a baited hook.



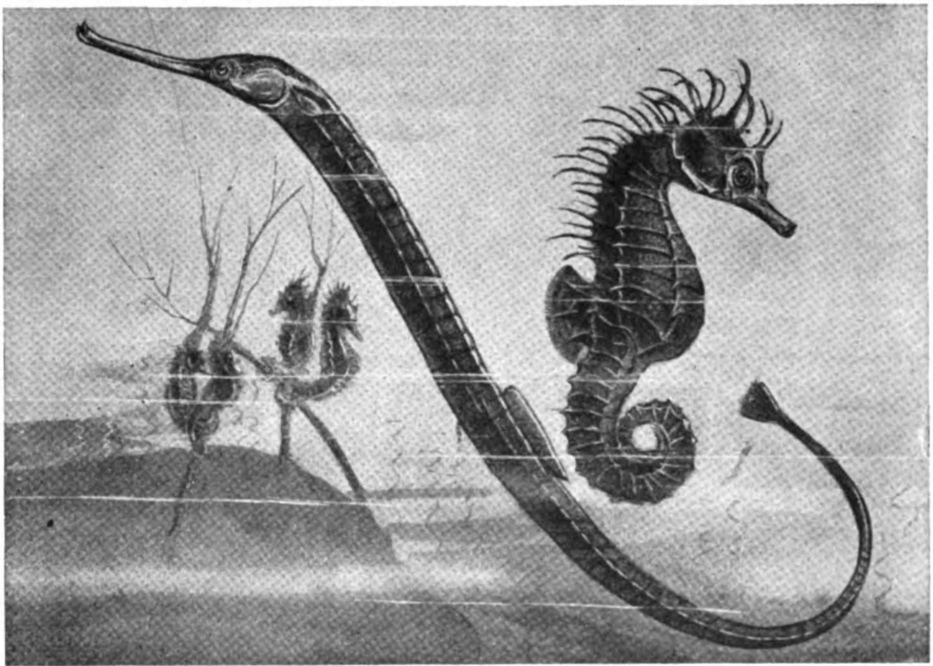
The angler-fish is one of the ugliest and laziest, but one of the most skilful fishes in the sea. The angler-fishes of long ago were good swimmers, but modern ones lead a slothful life down at the bottom of the sea. Prevented by its habits from catching prey by speed, the angler depends upon trickery. It buries itself in the mud, but leaves sticking up a curious tentacle, which attracts other fishes, and they are then seized by the angler's terrible jaws.

PIPE-FISH, POISON FISH, & THE SEA-HORSE

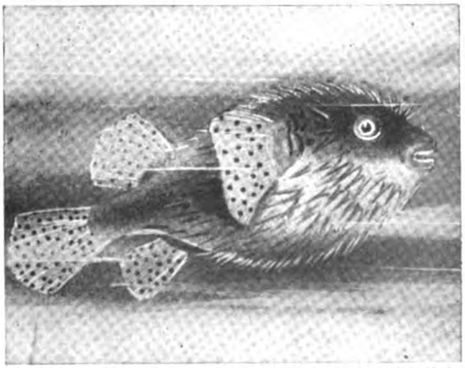


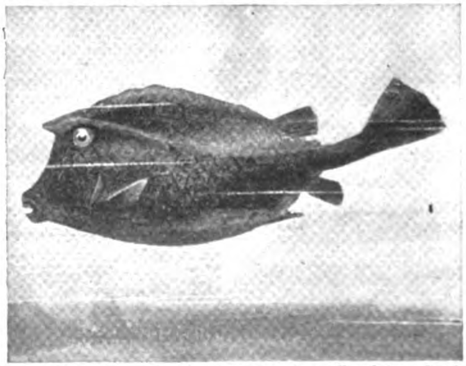


Here we have two poisonous fish. The first is the parrot-wrasse, to eat which would make us ill. The second, the sting-bull discharges its poison into wounds which its prickles make, but the fish itself forms good food.



We can see at once from its curious mouth why the larger of these fishes is called the great pipe-fish. The smaller is our famous little sea-horse. The male of the family carries its children in a little pouch, like the kangaroos.





Two of the strangest creatures of the sea are the globe-fish, which we see on the left, and the coffer-fish. Both are highly poisonous as food, because they eat food from the corals, which is poisonous to us, though wholesome diet to them. The globe-fish inflates itself like a little balloon and, guarded by its prickles, is safe from enemies.

these it stirs up the sand and mud so as to hide itself while it arouses the curiosity of other fish and draws them near. If this fails, the angler lies buried with a fishing-rod in action. The fishing-rod is a long tentacle sticking up from the head, with a sort of fringe at the end. This the angler is able to agitate, and fish, thinking it is something good to eat, approach to seize it, to be themselves engulfed in the fearful mouth of the sea-devil.

The angler-fish gets along well enough on his fins under water, but there are smaller fish, called the mud-skippers, which do the same with theirs on land. They leave the sea or the rivers up which they have made their way, skip about on the mud, snap up flies or insects, climb trees, and, when resting, raise themselves on their fins as we do on our elbows, and watch the world around them with the most comical look.

We do not expect to see fishes climb trees, but the curious mud-skippers we see here do. They come ashore and lie snapping at flies and other insects.

All sorts and sizes of mouths and teeth are distributed among the fishes, and we now come to some which are called pipe-fish, because of the pipe-like shape of their mouths. We have a famous member of this family in our waters, the hippocampus, or sea-horse. It gets its name from the fact that with its bright, prominent eyes, the shape of its mouth, and two little fins on the top of the head which look like the cocked ears of a horse, it presents much the appearance of that animal's head. The sea-horse is like some of the monkeys and other animals—its tail is a sort of hand to it. When it wishes to rest, it coils its tail round a piece of seaweed, and there holds, floating in the water, seeking the food that comes by.

A FISH THAT CARRIES ITS YOUNG IN A POUCH, LIKE THE KANGAROO

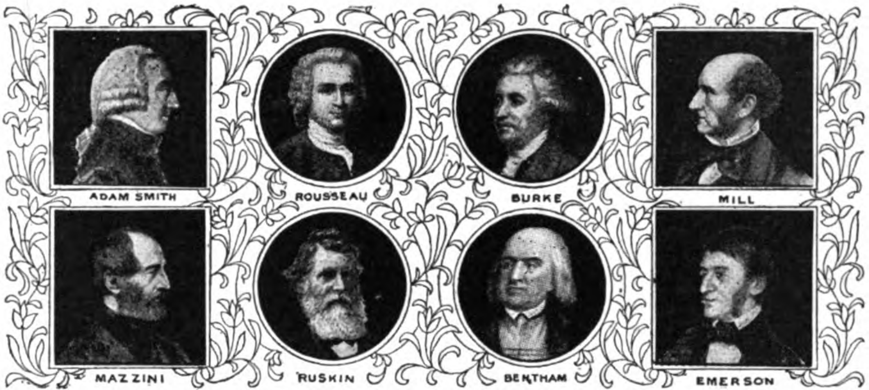
Another interesting feature about this pretty pipe-fish is its resemblance to the kangaroo. The male collects the eggs which the female lays, and stores them in a little leathery pouch which he has under his body. There the eggs hatch, and when the little fish are born this pouch is their cradle, to which they always repair in time of danger. Most of us who have read thus far have agreed that there are many sorts of fish which we should not care to eat.

THE POISONOUS FISH AND THE STINGING FISH THAT SWIMS IN ENGLISH WATERS

Some of the fish are poisonous at all times, others are poisonous at certain periods of the year. Some of the latter are to be found among the strange and often beautiful fish which haunt the coral beds. The food that they eat contains poison, and its power is exercised upon people who eat the fish. Among those always poisonous are the parrot-wrasses, West Indian herrings, and certain kinds of file-fish, coffer-fish, and globe-fish. The last three are very curious fish. The coffer-fish is enclosed in a framework like a box; the file-fishes have teeth like files; the globe-fishes are the hedgehogs of the sea, prickly things, as bad to handle as a ball of spikes. Some of them can inflate themselves with air, like a balloon, and then they float at their ease, safe from attack because of their deadly spines. There is a fish in English waters, the sting-bull, which carries a nasty poison. Measuring from a foot to 17 inches, it is armed with sharp prickles along its back. If the hand of a man be pricked by one of these, the poison enters the wound, and in a few minutes he feels the pain right up to the shoulder. Three men, one after another, have been stung by one fish. But the sting-bull forms excellent food.

There are thousands of other fish in the sea, beautiful and ugly, good for food and poisonous; but we cannot follow them further. We must now have a look at those other interesting creatures, the animals which live in shells.

The next nature story begins on page 269.



FAMOUS MODERN THINKERS

ROUSSEAU. BENTHAM. MAZZINI. BURKE. ADAM SMITH. MILL. CARLYLE. EMERSON. RUSKIN.

CONTINUED FROM 124

THOMAS CARLYLE

On one occasion when Boswell had returned from abroad, Dr. Johnson said to him in a sarcastic tone: "It seems, sir, you have kept very good company abroad, Rousseau and Wilkes!"

"My dear sir," answered Boswell, "you don't call Rousseau bad company. Do you really think him a bad man?" Johnson replied: "Sir, if you are talking jestingly of this, I don't talk with you. If you mean to be serious, I think him one of the worst of men, a rascal who ought to be hurled out of society, as he has been. Three or four nations have expelled him, and it is a shame that he is protected in this country."

That is one view. Lord Morley gives another: "It was Rousseau who first in our modern time sounded a new trumpet-note for one more of the great battles of humanity. He makes the poor very proud, it was truly said. . . . It was in Rousseau that polite Europe first hearkened to strange voices and faint reverberations from out of the vague and cavernous shadow in which the common people move. . . . The race owes something to one who helped to state the problem, writing up in letters of flame at the brutal feasts of kings and the rich that civilisation is as yet only a mockery, and did furthermore inspire a generation of men and women with the stern resolve that they would rather perish than live on in a world where such things can be."

A writer has described a visit to this Jean Jacques Rousseau on the fourth floor of a house in Paris: "We passed through a very small antechamber, where the household utensils were neatly arranged, and from that into a room where Jean Jacques was seated in an overcoat and a white cap, busy copying out music.

"He rose with a smiling face, offered us chairs, and resumed his work, at the same time taking a part in conversation. . . . Near him was a spinet, on which from time to time he tried an air. Two little beds of blue and white striped calico, a table, and a few chairs, made the stock of his furniture. . . . His wife was sitting mending linen; a canary sang in a cage hung from the ceiling; sparrows came for crumbs on to the sills of the windows which on the side of the street were open; while in the window of the antechamber we noticed boxes and pots filled with such plants as it pleases Nature to sow. There was in the whole effect of this little establishment an air of cleanness, peace, and simplicity which was delightful."

Two swallows built their nest in Rousseau's bedroom, and there hatched out their brood.

"I was no more than a door-keeper for them," he said, "for I kept opening the window for them every moment."

They used to keep on flying round about his head with a great stir until he had fulfilled this humble duty.

ROUSSEAU, THE STRANGE, BAD MAN WHO WAS GOOD TO THE POOR

Now, you will think that Dr. Johnson exaggerated when he said that Rousseau ought to be transported. But the truth is that Rousseau is one of those strange men about whom it is possible to hold two opinions, and those the most contradictory. Lord Morley, in his great book on Rousseau, quoted a verse of Victor Hugo's, which likens the soul of a man to a pool; in the still water is mirrored the sky tinged with heaven's fire, and beneath is the loathsome slime, where black and shadowy reptiles creep dimly through the dark. Such was Rousseau's soul.

Rousseau was an angel of light to the poor. He saw a world where men suffered, women grew spiritless, and children went hungry, cold, and ignorant; and where those who sought to make things better got lost in a maze of words. To Rousseau it seemed that one thing only was necessary—*to simplify*.

He wanted to simplify religion, so that all men might share its comfort; to simplify social relations by making all men equal; to simplify manners by homeliness and thrift; and to simplify literature and art, and life in general, by what he described as "a return to Nature"—that is to say, by constantly referring ourselves to Nature itself instead of to society and books.

THE MAN WHO SOWED THE SEEDS OF THE FRENCH REVOLUTION

He was stung by pain and suffering as Dr. Johnson could never be. "Worn-out horses," he exclaimed, "ready to expire under the blows they receive; wretched peasants, attenuated by hunger, broken by weariness, clad in rags; hamlets all in ruins—these things offer a mournful spectacle to the eye; one is almost sorry to be a man, as we think of the unhappy creatures on whose blood we have to feed." But if Rousseau felt these things more keenly than Dr. Johnson, he did not possess that great man's solid and lasting common-sense. Dr. Johnson was a good man. Rousseau was a bad one. To tell Rousseau's story, even in brief, would be to shock and disgust us. It is enough to know that the later years of his life were spent in some form of madness, the seeds of which were probably growing all through his youth and manhood.

We cannot explain these things. The great and virtuous Dr. Johnson never altered one cruel, wicked, or tyrannous injustice. The mad Rousseau made the poor very proud. It was from Rousseau that the great movement sprang in France which altered the whole system of government. We may say that he sowed the seeds of the French Revolution, and gave to all other nations fresh ideas and grander ambitions.

THE GREAT WATCHWORD THAT JEREMY BENTHAM GAVE THE PEOPLE

He who invents a great phrase does more than preach a sermon, for a phrase that sticks in the mind is like a lever thrust under the thoughts of men in order to turn them into a fresh channel. The older we grow the more we shall see how mighty a thing it is to change men's opinions. Every man clings to his own ideas. Outside the radius of his own light all is darkness. And this darkness is not illuminated by long books and speeches glowing with fine words. It yields before the flash of a pithy sentence.

To Jeremy Bentham belongs the honour of turning men's minds in a new direction; and this he did by a single phrase. While but a few pored over his long books, the soul of Europe seized upon one single sentence therein and flashed it like a torch into the darkness that surrounded them.

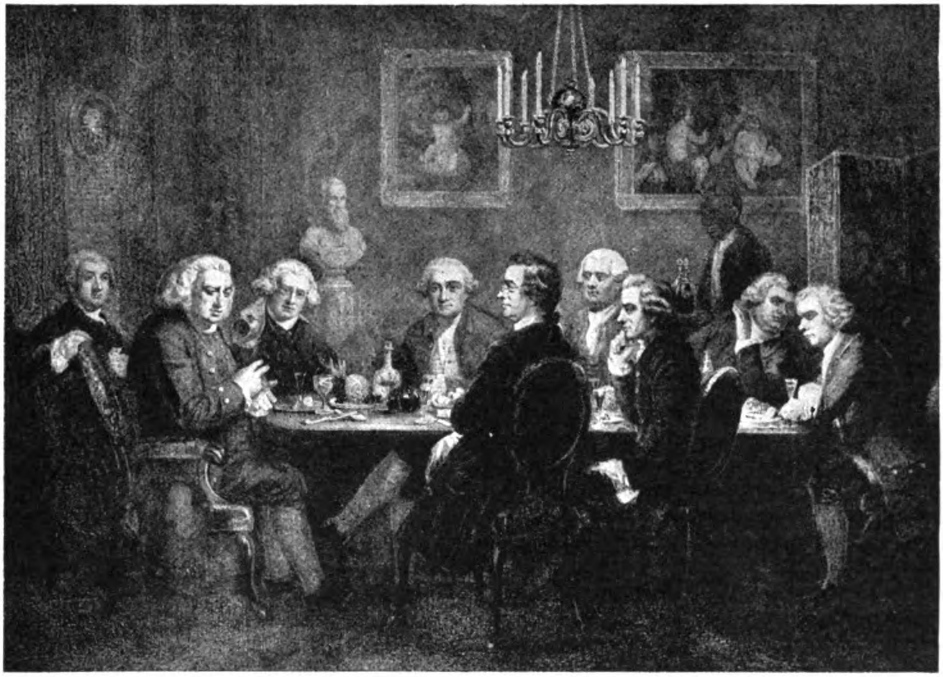
This phrase was not strictly his own, but he it was who made it live. It runs simply enough: "The greatest happiness of the greatest number." Bentham wanted to find a reason for things—a reason for morality and a reason for law; he discovered it in this simple phrase. The object of morality and the object of law is the greatest happiness of the greatest number.

Before his day men thought loosely about such subjects. Law was to punish crime. Morality was what the priest ordained. Bentham revealed deeper foundations. Law did not exist to protect the rich man's purse from the thief, but to secure the freedom and happiness of all men. Morality was not born out of the clouds; it was man's own discovery for the blessing and advance of the human race. All the efforts of government justified themselves only if they aimed to secure the greatest happiness of the greatest number. Does not this seem simple to us, and striking? Even now happiness is regarded by many people as the exclusive property of the few.

But before Bentham's day the masses of people in the world were almost resigned to the idea that only the rich could be happy, and that it was to protect the rich that there were laws and morality. Jeremy Bentham developed the splendid thought of Bacon that philosophy must be the servant of humanity. He invented the word *utilitarian* to describe the only philosophy that was worth while, a philosophy that was useful to the human race. He did not believe in dreaming of ideas. He wanted philosophers to show the human race—the greatest number of the human race—how to be happy.

There are faults in the details of Bentham's theory. Some object to its main idea. We should have to agree first in what happiness consists before we could march forward. And we should have to remind ourselves of Bacon's noble saying, "Prosperity doth best discover vice, but adversity doth best discover virtue," before we could be certain of our goal. Nevertheless, our debt to Bentham is a great one, for he established both law and morality on a sure foundation at a time when men, ill-educated and made hasty and reckless by suffering, were inclined to hurry all such things to the fire of destruction.

And Bentham also gave to men the Christlike principle that they should consider the happiness of other people before everything else. If every politician, preacher, writer, and private person truly sought the greatest happiness of the greatest number, we should be within sight of the Golden Age.



A party of famous men at the house of Sir Joshua Reynolds, the first president of the Royal Academy. Reading from the left hand the names are James Boswell, Dr. Johnson, Sir Joshua Reynolds, David Garrick, Edmund Burke, Charles Burney, Paoli, the Corsican patriot, Thomas Warton, and Oliver Goldsmith.

Bentham was the son of a rich man, and was born, very weakly of body, in Houndsditch, London, in 1748. He read history when he was three years of age, and at the same time began to learn Latin. At six he was playing the violin, and he matriculated at Oxford when he was only thirteen. He loved music to the end of his days, and kept a piano in every room of his house. He was fond of flowers, and had many shady walks in his London garden. He was modest, hospitable, and simple in his conversation. He died aged eighty-four. His body was dissected—as he had instructed—and, after being embalmed and dressed in his usual garments, it was set up in University College, London.

Room must be found in this brief chronicle of great thinkers for the noble-minded patriot of Italy, Joseph Mazzini. He was a man who loved Italy above everything else on this earth, and God above everything else in the universe.

JOSEPH MAZZINI, THE PATRIOT THINKER OF ITALY

He spent his life in exile, was imprisoned, was banished from country after country, and for many years lay under sentence of death. But his faith never wavered. At the dawn of his manhood he founded a society called Young Italy, which was to work for the freedom of the country, then oppressed by foreign tyranny and torn by quarrels within itself. The motto of this society was "God and the People"; on its banner were the words "Unity," "Independence," "Liberty," "Equality," and "Humanity." From these ideals he never swerved.

His call came to him as he lay in prison. Looking out from his cell, he could see the sky and the sea. "Symbols of the Infinite" he called them. His only companion was a greenfinch; his only books were "a Tacitus, a Byron, and a Bible." In these circumstances it was that the call came to him, "God and the People."

The great work which he did as a patriot of Italy belongs to the world. His patriotism ennobled humanity. Every nation has been the better for his life. Mazzini was one of those great souls who recognise God in politics. He did not seek to make the Italians free only that they might earn more wages and work fewer hours; he preached to them a lofty gospel of duty to God and man; he set virtue always before their eyes. The mere political agitator, who sets class against class, would have felt the lash of Mazzini, who loved the common people because he always believed them to be the children of God.

EDMUND BURKE, WHO MADE MEN SEE THE PRINCIPLES THAT MOVED THEM

If we heard someone praising Edmund Burke, and asked what it was he did to deserve praise, the admirer of Burke would not be able to point to any definite achievement. He would not be able to say that Burke conquered this or that country, nor that Burke tore down a tyrant from a throne, nor that he wrote a book which has been the comfort and consolation of unhappy men. And yet the name of Edmund Burke remains one of the very greatest in the history of the world. He was only a voice, but a voice of power.

It has been finely said of him that he made great tides in human destiny very luminous. This meant that he could make men see the current of principle which carried them forward, make them aware of the reasons which moved them. The work of the great thinker is that of the interpreter. He interprets into human language the deep and obscure feelings of the soul. We know that we are often carried away by feelings, that we are often driven to do things without knowing why; it is the same with all men and women, and with nations. We are all conscious of being swept into certain actions, or of being intensely occupied by certain notions and ideas; but we cannot explain in simple language what it is that moves us.

HOW BURKE STOOD FOR FREEDOM AND HONOUR AMONG THE BRITISH PEOPLE

Burke was one of the great interpreters of justice, freedom, and morality. The work of which he was proudest was the spirit of justice, freedom, and morality which he breathed into our rule of India. He attacked before the whole world one of his own countrymen, Warren Hastings, for misconduct in India. This impeachment in itself was a small matter; the glorious result of it was that the whole of England realised its responsibilities in India for the first time. Burke made Englishmen feel the glory of freedom, the honour of justice,

BURKE SPEAKING AND EMERSON WRITING

Edmund Burke was one of the greatest political thinkers. He believed in steady progress, but never ceased to denounce the French Revolution. The famous dagger scene in Parliament has become historic. Declaring that daggers were being made at Birmingham, he hurled one upon the floor of the House of Commons, exclaiming: "That is what you are to gain by an alliance with France." He was much laughed at for this action.

Ralph Waldo Emerson, our American poet and essayist, was one of the most original thinkers of the nineteenth century. He taught that the soul of man is the master of the intellect and the will, and by its illumination man can interpret the mysteries of Nature. A man of sweet and gentle character, he lived simply and quietly, and here we see him in his study at Concord, which was not only the study of a scholar, but the bower of a poet.

and the eternal necessity for morality. Ever since his day England has endeavoured to govern her vast empire, not as something to make her rich, but as something for which she is responsible to God and humanity.

THE ENGLISHMAN WHOSE VOICE MOVED ALL EUROPE

Burke stood for the honour of the English nation when George III. would have taken away their privileges, and made himself an autocrat. Burke was on the side of France in the Revolution, till the justice of that movement clad itself in the murderer's dress and built its walls of freedom in the blood and agony of despotism. He was ever on the side of justice and freedom, but it was as a man conscious of righteousness.

Although he practically swayed Europe with his voice, he had no place of power in England. When Windham received one of his greatest books, he wrote in his diary: "What shall be said of the state of things, when it is remembered that the writer is a man decried, persecuted, and proscribed; not being much valued even by his own party, and by half the nation considered as little better than an ingenious madman?" Oliver Goldsmith made a mocking epitaph upon him:

Here lies our good Edmund, whose genius was such,
We scarcely can praise it or blame it too much;
Who, born for the universe, narrowed his mind,
And to party gave up what was meant for mankind.

Dr. Johnson said that you could not meet Burke for half an hour under a shed without saying that he was an extraordinary man. It is curious to relate that, at the end of his days, the king was going to make him a peer, with the title of Lord Beaconsfield. Before this happened Burke lost his only son, who was a foolish fellow. But this son was loved passionately by his father, who sank under the loss.

THE STORM OF SORROW THAT BOWED DOWN A STRONG MAN

"The storm has gone over me," he wrote, "and I lie like one of those old oaks which the late hurricane has scattered about me. I am stripped of all my honours; I am torn up by the roots and lie prostrate on the earth. I am alone. I greatly deceive myself, if in this hard season I would give a peck of refuse of wheat for all that is called fame and honour in the world."

One of his wisest sayings about government was: "The question with me is not whether you have a right to render your people miserable, but whether it is not your interest to make them happy."

This wonderful man was born in Ireland, and made his way in the world with no interest of any kind. His father refused to help him because he would not follow the law as a profession. By his own splendid powers, his devotion to work, and his faith in the justice of his cause, he rose to be the inspiration of political Europe.

ADAM SMITH, THE SIMPLE MAN WHOSE BOOK GAVE MEN NEW IDEAS

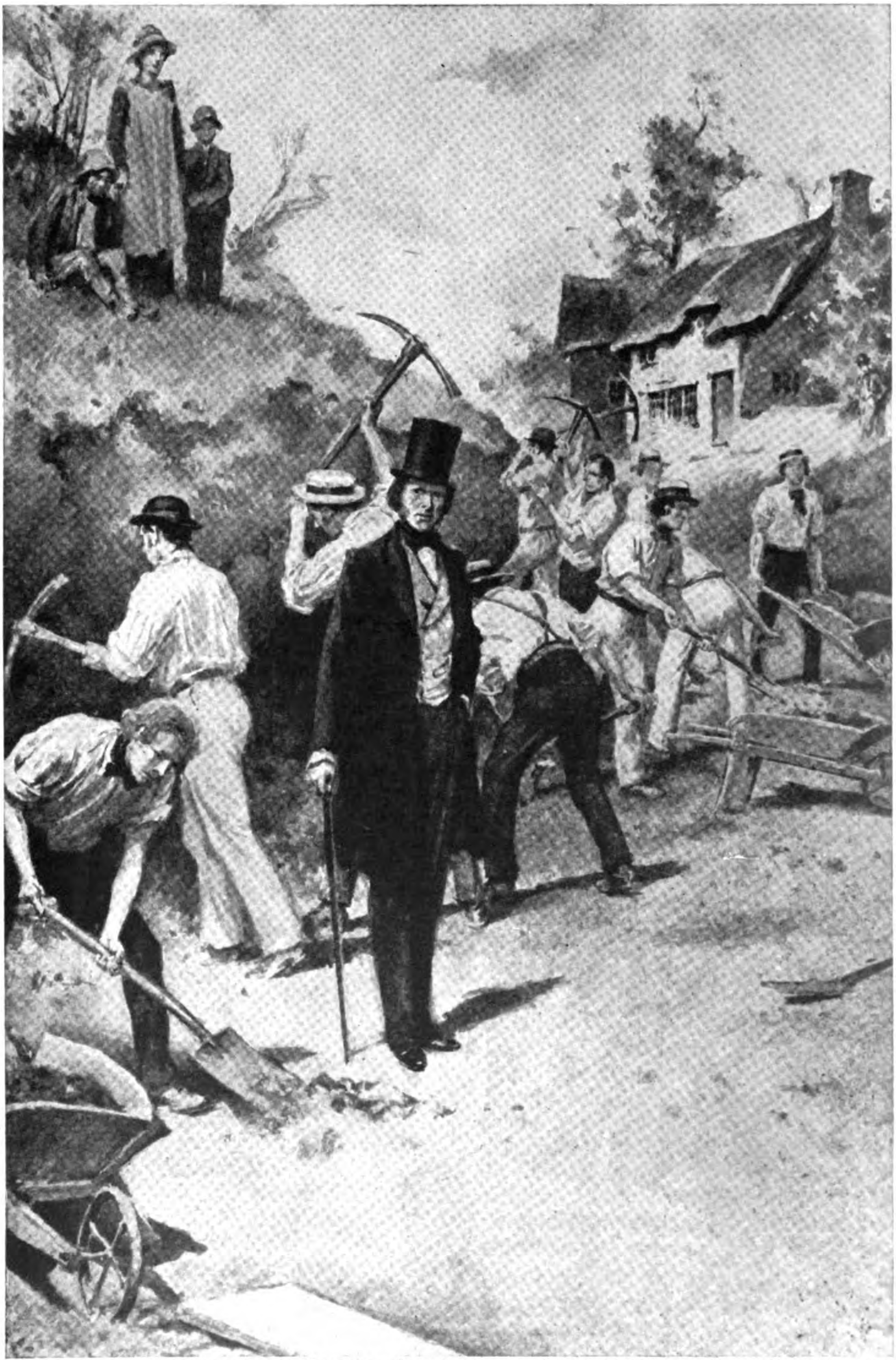
Adam Smith, a great writer on political problems, was a Scotsman, and as a child was stolen from his mother's door by travelling tinkers. His book, called "The Wealth of Nations," altered the ideas of men both in England and abroad. He was devoted to the working class, and was suspicious of tradesmen, merchants, and manufacturers.

"It is but equity," he says, "that those who feed, clothe, and lodge the whole body of the people should have such a share of the produce of their own labour as to be themselves tolerably well fed, clothed, and lodged." Also: "Our merchants and manufacturers complain much of the effect of high wages in raising the price, and thereby lessening the sale, of their goods both at home and abroad; they say nothing concerning the bad effects of high profits; they are silent with respect to the pernicious effects of their own gains; they complain only of those of other people."

This great and good man received honours on every hand, and followed his simple, modest, and useful habits to the end of his life, in 1790. He was a friend of Hume, the historian, and was known to the first minds in France. He became Lord Rector of Glasgow University.

John Stuart Mill was a man whose life will always remain one of the most interesting in human chronicles. His father, the son of a Scottish shoemaker, had raised himself by sheer force of literary industry to a position of importance in London. He had original

HOW JOHN RUSKIN TAUGHT HIS STUDENTS



John Ruskin was a daring and original teacher of art, but he was also a bold thinker on the problems of modern life; and although his views were at first laughed at, it is now generally recognised that much of his teaching **was right. While a professor at Oxford, Mr. Ruskin took his students out to break stones and make up the roads, in order to impress upon them the dignity of labour and to improve the appearance of the country.**

notions about things, and did not believe in schools. He educated his young son himself, and at three years of age John was learning the Greek language. The boy grew up in the companionship of this earnest father, and early in youth manifested singular powers.

THE SUDDEN THOUGHT THAT CAME TO JOHN STUART MILL

He was a man before he was a boy, and could hardly remember the time when he did not think. He received his "call" from reading a French translation of a work by Bentham. He set himself with enthusiasm to see the way which led to the greatest happiness of the greatest number. He wanted to make life happier and nobler, and he saw that the way out of misery could only be found by resolute thinking.

While he was striving with great enthusiasm for this grand object, a sudden chill struck through his soul. His soul asked the question: Suppose that all your objects in life were realised, that all the changes in institutions and opinions which you are now looking forward to could be completely effected at this very instant, would this be a great joy and happiness to you? He saw that his happiness lay in working for the grand end, not in the end itself. "I seemed," he said, "to have nothing left to live for."

So it must be with all philosophers and politicians who do not see that progress is infinite and eternal; that there cannot be any *end* at all, because man is immortal.

Mill found his work in seeking how to guard democracy from self-destruction. Many people thought that if workmen were given a vote the empire would fall to pieces, religion would be trampled underfoot, and the race of Englishmen would perish in sin. Mill did not think the danger was so great; but he certainly felt that something should be done to teach workmen, and, indeed, all kinds and conditions of men, that life was a serious and delicate experiment.

THE PLAIN PHILOSOPHER WHO MADE THE MULTITUDE THINK

The shouter at a street corner often knows nothing of history; he cares little what he says; he handles life as if it were a box of bricks. Mill saw that all men accepted the ruling of great men in the matter of science, and he thought it should be possible to form a science of politics, the masters of which would tell democracy what was right and what was wrong in the ideas of politicians. He wanted certainty.

All his chief work was in this direction. He failed; but it was a failure which is better than many victories. There can never be certainty in opinions, and politics is largely a matter of opinions. Mill, however, has taught men to be careful how they think, and still more careful how they speak. He has shown us the danger of words, and made us steady workers for change, instead of violent, hot-headed revolutionists. More than this, he set people thinking who had never thought before, and to those who did think he brought more subjects for their thoughts, and fresh ideas for their illumination. He was one of those quiet and self-contained philosophers who effect great reformations by making the multitude think.

THOMAS CARLYLE, THE SCOTSMAN WHO ROARED AT THE WORLD

A very different man from Mill was his friend, Thomas Carlyle. Carlyle had no nervousness in his nature, no hesitancy about speaking. He opened his mouth and roared at the world. He was sure that what he had to say was the only thing worth saying, and, accordingly, he said it with energy.

Carlyle's gospel was the gospel of great men. The workman, armed with a vote and become master of the British Empire, was bid by this big-hearted Scotsman to study great men, to listen to the heroes, to bow before the divinities of the human race. While Mill was seeking, with laborious care, for certainty, Carlyle was shouting to the world that salvation lay in the worship of great men. He felt that he had read the riddle of the Sphinx.

There is much excellent truth in Carlyle. Huxley, the man of science, said that Carlyle's writings had saved him from becoming an idle and light-minded man, had made him earnest. But Carlyle rather overdid his gospel, for he was preaching energy to the most energetic nation on the face of the earth. He did not bring home to Englishmen their need for modesty, gentleness, refinement, spirituality. He shouted, "Work!" to a working world. He preached the very thing that has made us rich and kept us ignorant. But his influence for good was enormous. Carlyle is like some Old Testament prophet. His words burn and glow. His face seems to shine with the light of God. His was a voice raised up for eternity and immortality, at a time when men were losing faith in their high destiny. We cannot read him without feeling the spell of his words. He was full of a noble fervour. His soul was sure of God.

THE TERRIBLE MISTAKE OF A SERVANT GIRL, AND THE HEROISM OF CARLYLE

There was one story about him which shows his courage. He had written the "History of the French Revolution," an immense work, and lent the manuscript to his friend Mill. By some terrible mistake this precious manuscript was burned by a servant girl. With this great misfortune all the toil and labour of years vanished in smoke up the chimney. When Carlyle heard it, he sat down and read Marryat's novels for a week; then he set to and re-wrote the History. Probably no other writer has ever had such a task to face.

His life was a long martyrdom to indigestion. His temperament was affected by this trouble, and he was not always as kind to his beautiful and brilliant wife as he might have been. She died in her carriage as she was driving round Hyde Park, after having received a telegram telling her of some great success of Carlyle in Scotland. Her death broke his heart. Filled with remorse for his harsh treatment, he spent his last years in mourning for this lovely woman, whom death had taken from him. His last years, if not his whole life, were a tragedy. But his works live, and men will feel the power of his mind for many generations.

EMERSON, THE SMILING PHILOSOPHER, WHOSE FAITH WAS IN THE SOUL

Ralph Waldo Emerson, our American essayist, believed, like Carlyle, in the uses of great men. "The race goes with us on their credit. The knowledge that in the city is a man who invented the railroad raises the credit of all the citizens. But enormous populations, if they be beggars, are disgusting, like moving cheese, like hills of ants, or of fleas—the more the worse." Emerson began life as a minister of the Unitarian Church. This church believes in one God, and declares that Jesus is the supreme human Authority. Emerson believed passionately in one God. He remained to the end of his days a devout admirer of the character of Jesus, but he could not feel that Jesus was the only and supreme Authority. He taught that a man's own soul was the chief revelation of God. Soon, therefore, it became necessary for him to leave his church, and he turned to literature and lecturing for a livelihood.

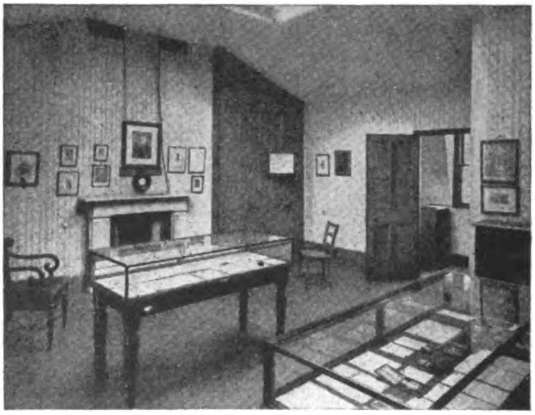
His face is described as "radiant" and "angelic"; his voice was full of beauty and intensest music. Such a lecturer soon had the world at his feet. "Emerson," says one writer, "was a sweet-tempered Carlyle, living in the sunshine; Carlyle was a militant Emerson, moving amid thunder-clouds." Both believed ardently in a spiritual destiny for man; both felt with glowing fervour the glory and satisfaction of God. While Carlyle declaimed, Emerson smiled. Emerson had the beauty of a tranquil faith, and the composure of a soul that was deeply touched by the sense of eternity.

THE TEACHING OF RALPH WALDO EMERSON AND JOHN RUSKIN

The saying of Emerson, "Heroism feels and never reasons, and therefore is always right," expresses almost the soul of his teaching. He taught that no man can think or reason his way to the truth of the infinite universe. A good man, a pure man, whose soul is set to catch the splendour of God's power, will, on the other hand, find himself moved and influenced by the truth. "All goes to show," he wrote, "that the soul in man is not an organ, but animates and exercises all the organs; is not a function like the power of memory, of calculation, of comparison, but uses these as hands and feet; is not a faculty, but a light; is not the intellect or the will, but the master of the intellect and the will." His great faith was in the soul.

One of Emerson's most beautiful essays counsels men to follow the instruction of Jesus concerning prayer. "If he would know what the great God speaketh, he must go into his closet and shut the door," as Jesus said. God will not make Himself manifest to cowards. He must greatly listen to himself, withdrawing himself from all the accents of other men's devotion. Even their prayers are hurtful to him, until he have made his own. This was his teaching, the direct relation between a man's soul and the God of the Universe. He inspired men to feel at home in the Infinite. He made them feel, too, that vice and cruelty and wickedness were base things, unworthy of them. Many people, of course, find fault with Emerson's opinions, but he remains head and shoulders above the great moralists and essayists produced by America.

John Ruskin, the son of an English wine merchant, besides being a capable man of business, was fond of pictures, statues, and fine buildings. Mrs. Ruskin was a handsome woman, very severe in her ideas, ungracious in her manner, but entirely excellent in devotion to duty. The little son of these parents had a strange infancy; his body, his brain, and his soul were watched over with an unceasing anxiety; he was not allowed to play with toys; his intellect was trained from the very first to observe Nature and reflect upon what he saw; many times he was whipped as a boy.


The study at the top of his house in Chelsea, where Carlyle used to escape from the noise of the hawkers in the streets.

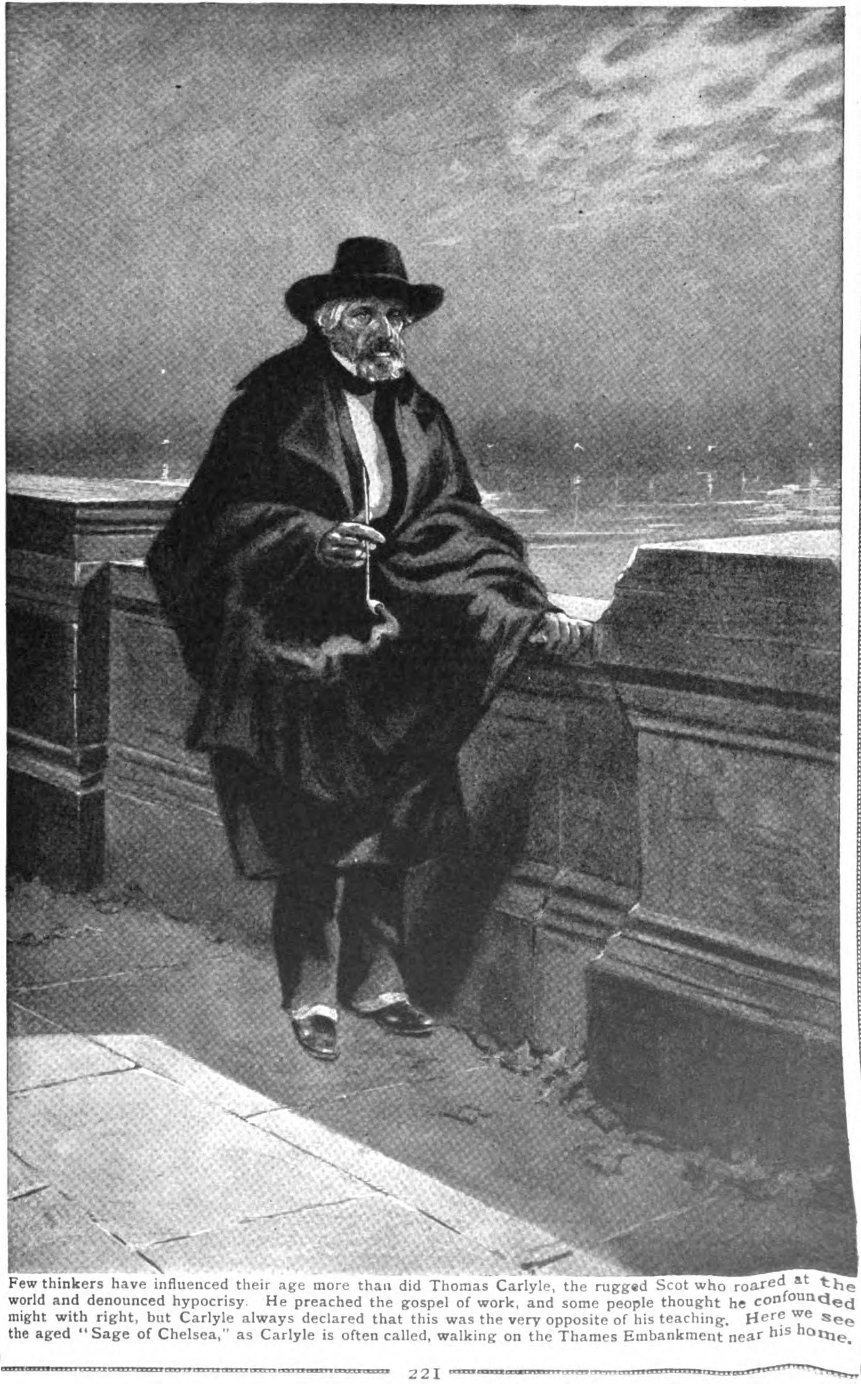
Thus trained, he grew to be extraordinarily clever, particularly in all matters relating to art. He became an enthusiastic worshipper of great buildings and noble pictures. He conceived the theory that buildings and pictures are the outward and visible signs of a nation's inward and spiritual feelings; buildings and pictures *express* a nation's religious feelings. His books on these subjects made him famous while he was still young.

Then came the natural next step. From the glorious buildings of the past he turned to those of the present—to the factory town, with its hideous chimneys, its blackened walls, its dreary streets of unmingled ugliness; and he condemned the whole system which could produce such a state of things. He attacked men of science and politicians; he said that they were wrong; he denounced their philosophers, and derided their "laws of economy." It was enough for him that modern life wore a sooty coat and went on broken boots. He wanted sun, rose-coloured clouds, green pastures, and palaces of stone. He condemned the world.

But when with lavish generosity he himself endeavoured to set up model factories, the efforts proved a sad failure. No, not a failure; there is no failure in the work of a true soul. Although the co-operative and socialistic attempt at a model industry came to an end, the idea lived, lives now, gathers in force, and is destined one day to rule the world. For man does not live by bread alone. As the race advances, it feels how unsatisfying are the mere wages of labour. Each generation, a little better educated than the last, feels itself carried forward to a goal more honourable than that which satisfied the past. Beauty becomes a religion. Ugliness wears the look of sin. This was Ruskin's work; in some ways the greatest work of modern times. His long life was loyally spent in bringing home to the business and bosoms of men the thought of beauty—beauty in buildings, in paintings, in vesture, in manners, in conduct. The forces against him were enormous—the forces of mammon, prejudice, and ignorance. But he neither stumbled nor quailed. His gospel has spread to other nations; his ideas are growing in the minds of every class. We cannot doubt that the present system, which makes life so hideous and dull, will pass utterly away and Ruskin's gospel of beauty become the religion of humanity.

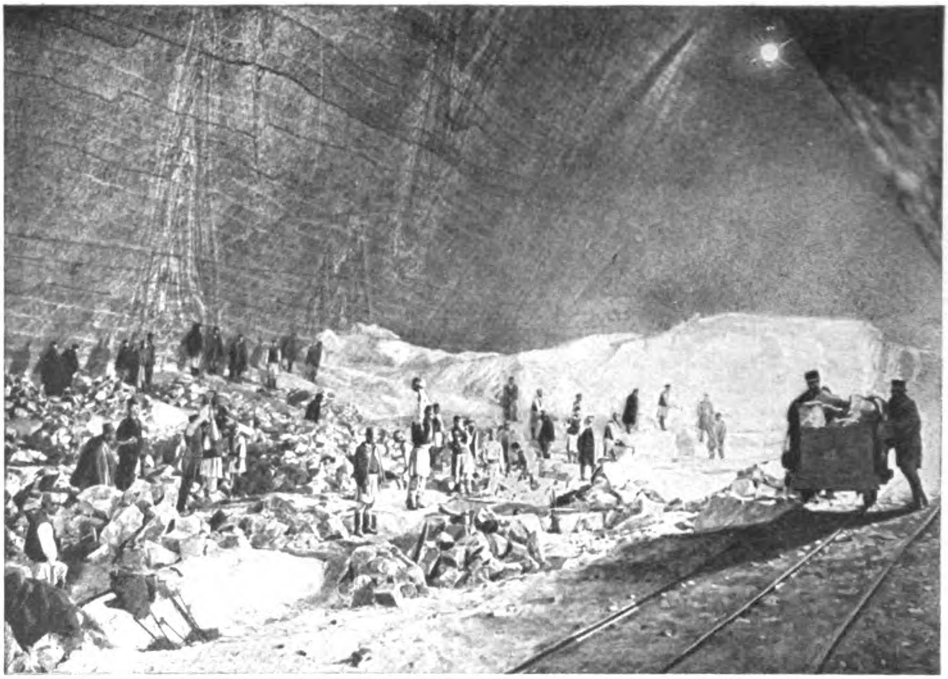
The next Men and Women begin on 279.

CARLYLE, THE MAN WHO DIGNIFIED WORK

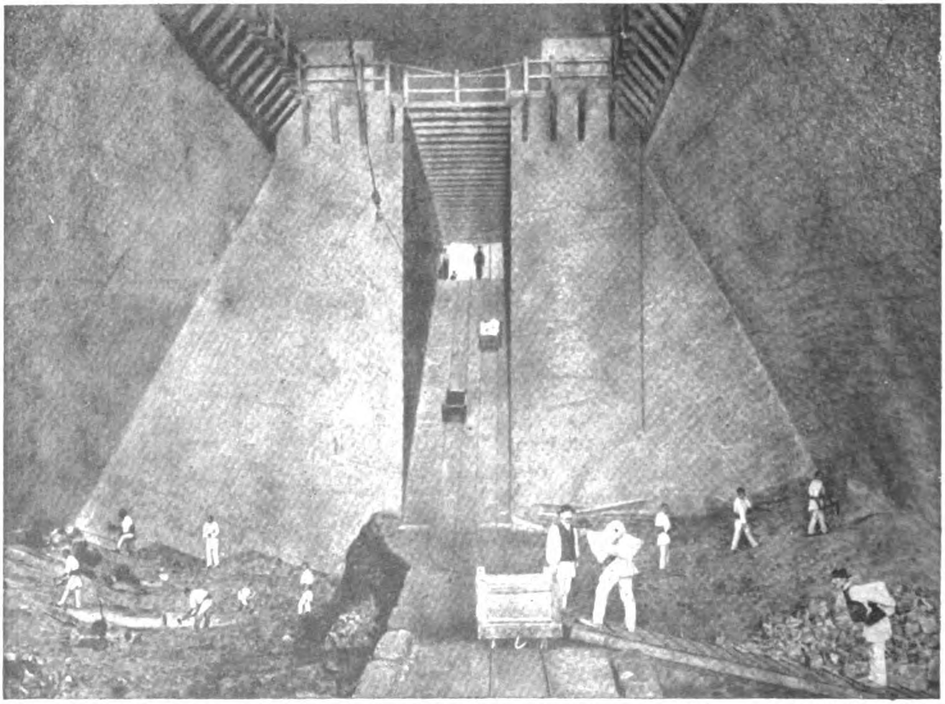


Few thinkers have influenced their age more than did Thomas Carlyle, the rugged Scot who roared at the world and denounced hypocrisy. He preached the gospel of work, and some people thought he confounded might with right, but Carlyle always declared that this was the very opposite of his teaching. Here we see the aged "Sage of Chelsea," as Carlyle is often called, walking on the Thames Embankment near his home.

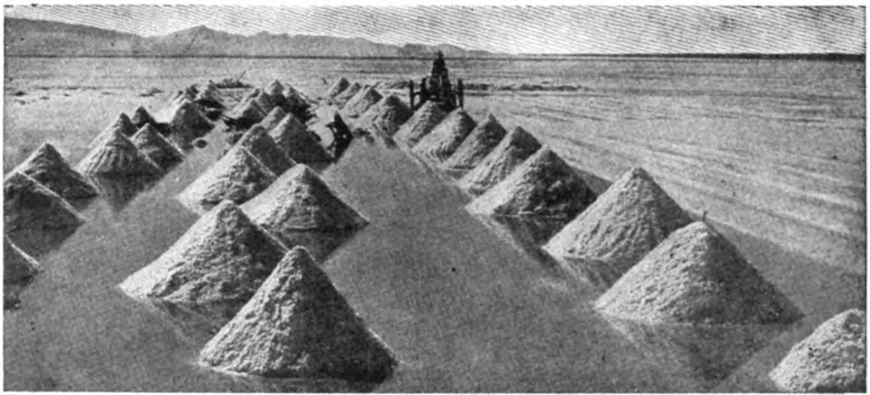
A WORLD OF SALT BELOW THE GROUND



This is the famous salt-mine at Slanicu, in Roumania, one of the largest salt-mines in the world. Nearly 80,000 tons are taken from it every year, and it is estimated that if 100,000 tons were taken yearly the mine would last for yet another 200 years. The mine is a great world of salt 340 feet below the surface of the ground.



The entrance to the great Slanicu salt-mine is by an inclined plane, up and down which run the trucks conveying the salt from the mine to the surface of the ground. Hundreds of men are employed all the year round in this marvellous mine, and its floor of salt is lowered every year by about six and a half feet.



This is a dried-up salt sea in the great Colorado desert, California. Here Indian labourers have washed the salt and stacked it in heaps ready for transport to the refinery. The salt deposits extend for many miles

THE SALT OF THE EARTH

CONTINUED FROM 171

SCATTERED everywhere and there throughout the great universe there are two elements, called sodium and chlorine, which are very fond of each other. Sodium is a curious, soft metal which can be cut with a knife, and is very difficult to keep pure; chlorine is a coloured gas which causes certain death to any kind of living creature if breathed in any quantity. But when sodium and chlorine unite, one atom of each with one of the other, they make a compound called sodium chloride, or common salt; and this is the salt of the earth.

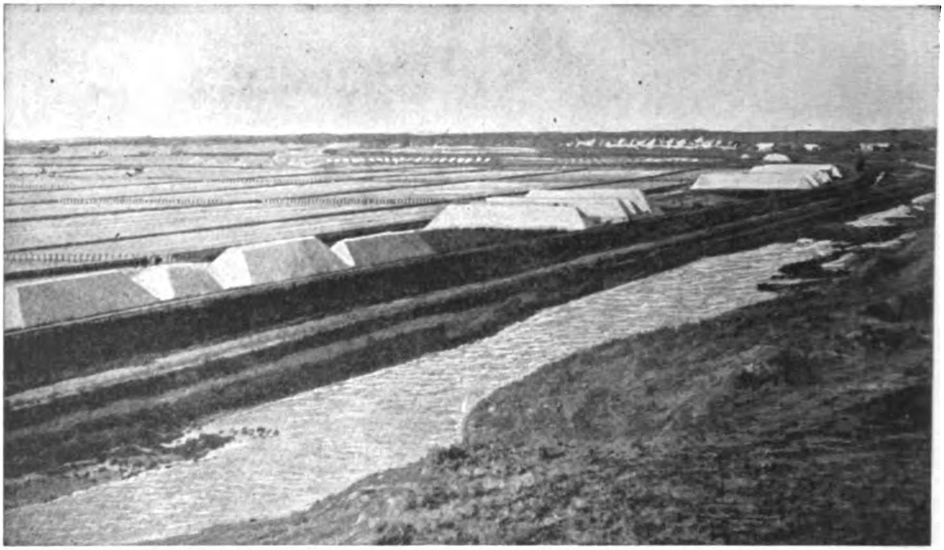
It is the most abundant salt in sea-water, and no number of figures could suffice to give us any idea of the amount of salt there must be dissolved in the sea. It is also very common upon the earth in places where salt water has been in days gone by. Even in our rivers and streams, a certain quantity of this salt will be found; but that is not all, for salt plays a part in the body of every living creature.

When there is a very great deal of salt in any place, it interferes with life, and that is why salt is used to preserve things from the action of germs which would make them go bad. Salt is invaluable for this purpose in the preservation of food, like meat and herrings. But when the proportion of salt is less, it serves the purposes of life. All life is lived in water, but we may go a step farther and say that all life is lived in salt water. So we must all have salt in our food, and indeed it is one of the foods without which no one can live. Our blood is rich in salt.

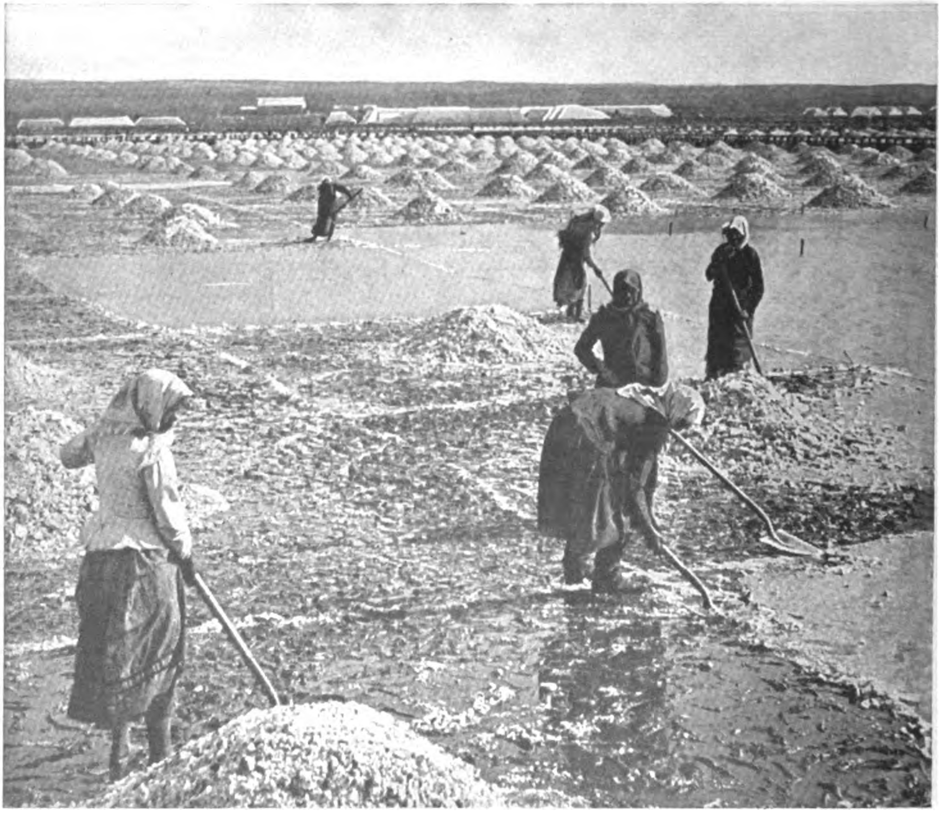
Salt and other compounds of sodium are to be found everywhere, and wherever salt or any compound of sodium exists and is made hot, it gives forth a special yellow light.

By passing any light through a prism, we can clearly detect the bright yellow lines that mark the presence of salt, or, rather, the sodium in the salt. It is only natural, then, to turn our attention to the light that reaches us from the sun and the stars, and no sooner do we do so than we find that the stuff which is in our bodies, which fills the sea, and even forms a sort of rock upon the earth, is abundant in the sun and in many of the stars. We cannot be surprised at this, for the substance called salt is necessary to life, and is found in all living creatures.

THOUSANDS OF TONS OF TABLE-SALT



The snowy salt that fills our salt-cellars on the dinner-table may have been dug out of the earth, or it may have been pumped from the earth in the shape of brine. This picture shows the wonderful Russian salt-field of Solinen, and, stretching away far into the background, we can see the vast tanks full of salt water, or brine.



After a certain time the water in the tanks evaporates, and leaves the salt glittering on the ground in the form of crystals. The salt-crystals are then collected and shovelled into heaps by women, as we see here, and these heaps are afterwards built into great white stacks containing hundreds of tons, like those shown in the top picture.

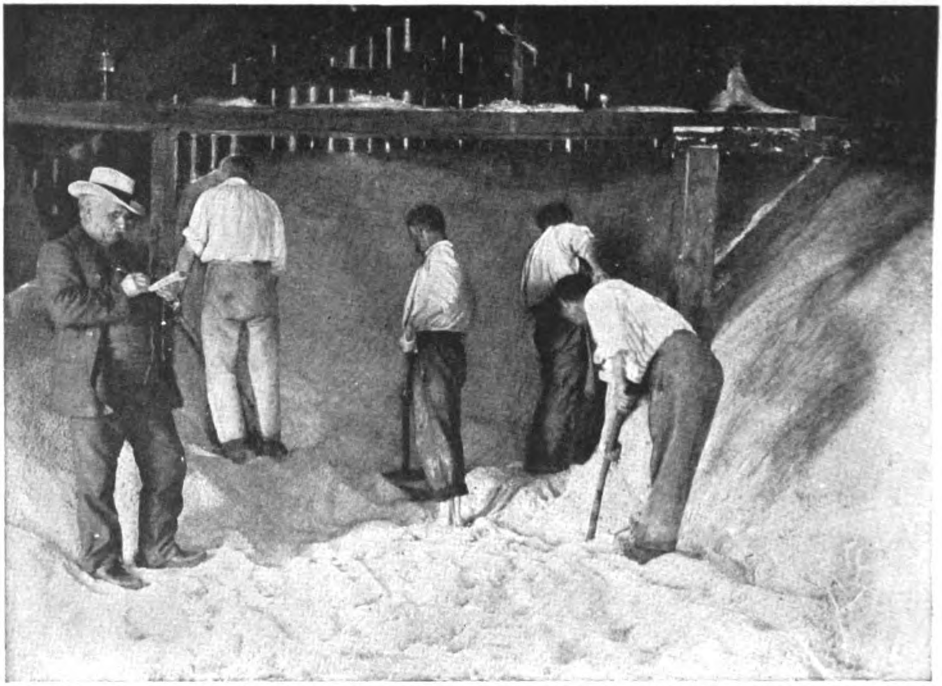
Photographs copyright by Underwood & Underwood, N. Y.

COLLECTING THE SALT FROM THE BRINE

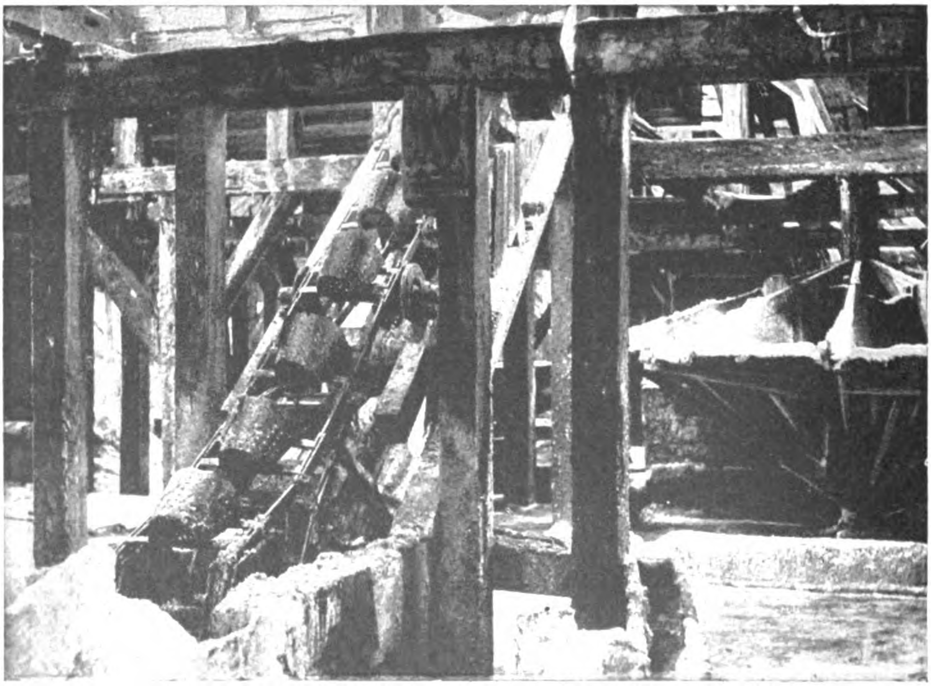
Sometimes, instead of waiting till the whole of the water has evaporated and left great masses of salt in the reservoirs ready to be collected, as shown on page 224, the crystals are raked out of the brine as soon as they begin to form. In some salt districts evaporation is assisted by artificial heat, the brine being boiled in huge pans.

As the salt forms round the edge of the reservoir it is raked into little heaps. This salt is then removed, and if a fine table-salt is wanted, it is placed in moulds, the water drained off, and the salt dried completely by artificial heat. For salt of a larger grain the brine is left untouched for a longer period, and the evaporation is slower.

MAKING THE SALT FIT FOR THE TABLE



When the water has been evaporated from the brine, the salt that is the result of this process is more or less coarse, and it is carted to the salt refinery, where the drying is completed and the crystals are ground by special machinery ready for the table. In this picture we see the mass of salt that is waiting to be refined.



Here is the scene in a salt refinery. The endless chain of buckets carries the damp salt to the drying-pans, from which it is removed for grinding. Then it is packed for the market. More than twenty-two million barrels of salt are produced every year in the United States.

The next Familiar Things are on page 293

WHAT THIS STORY TELLS US

WE learn more and more here of the wonderful way in which plants help to keep the world alive, and as we read we shall come to understand the great mystery of the stuff that makes the grass green. Without this we could not be alive. We know that all air contains carbonic acid gas, which is poison to us and to all animals. But the plant has a secret which no man knows of; it can split up this gas and live on it, taking it into its own body and building up food for us to live upon. To do this the plant uses the greatest power in the world, the power of sunlight. The leaves of a plant are flat and thin, so that they can drink in as much sunlight as possible, and the power of the sun helps the green stuff to split up the carbonic acid gas into two parts. One of these the plant eats itself, and the other it gives back to the air quite pure. If it were not for the plant's power of doing this there would be no life anywhere, and the world would be as dead as a stone.

A PLANT'S WONDERFUL SECRET

CONTINUED FROM PAGE 170

LET us now see what we mean when we say that a plant breathes. If we can understand this for a plant, we shall understand it for every living thing, including you and me. When we talk about breathing, we usually think of the way in which our chests move up and down, as we draw the air into our lungs when we are taking a breath, and then let it out again.

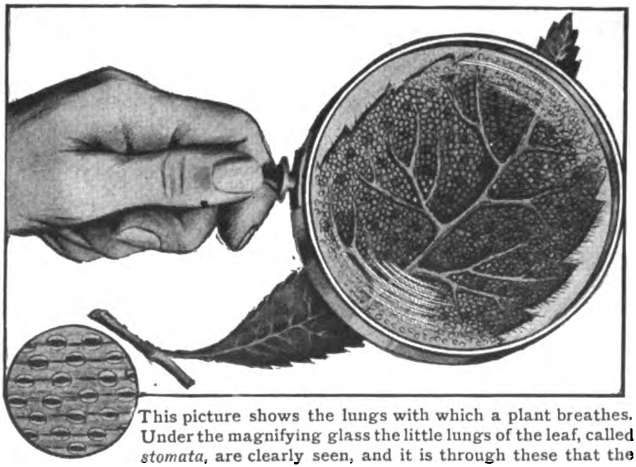
Now, a plant has no chest or lungs, and many animals have neither chest nor lungs, but yet they all breathe. It is not necessary that a living thing shall move up and down, or in any other way, in order for it to breathe. We do so; but that is because we breathe so very quickly, and because we have learnt a special way of breathing that is very easy and successful. But all breathing is really one and the same, whether it is done by a plant or an oak-tree, or a fish or a man.

Wherever living things are to be found, whether under the water or out of the water, there must always be a particular kind of stuff called oxygen. This is a thing we may have never seen or heard of, and yet, whenever we see anything at all, we see through oxygen—because it is part, and the most important part, of what we call air. Oxygen is found in air, and it is also found in water. If a living thing lives in air, it has to get its oxygen from the air. If it lives in water, it has to get its oxygen from the water. The first plants did this because they lived in water, like many plants of to-day, and like crabs and fishes and many other animals. But later plants, like the flowering plants, moved out of the water on to the land, just as animals have done, and so they have to get their oxygen from the air, just as cats and horses and birds and men do.

Breathing is an act that has two parts, which go on backwards and forwards always; and the first of these two parts is taking in oxygen. Every living thing does this, and must die if it ceases to do it. But what is the second half of this act of breathing? You may well ask. Directly we think about it we shall see that the oxygen which is taken in by breathing must go somewhere, something must happen to it, and the simple fact is that the second half of the process of breathing always consists of giving back the oxgyen to the air or to the water.

But if that were all, of course there would be no sense in it; it would not be worth doing. But the point is, that whilst the oxygen comes in alone, " by itself," it always comes out again with something else; and it is that which makes all the difference. This something else, though you could hardly believe it, is the same stuff as that which makes coal and diamonds and the writing part of lead pencils, and its name is carbon.

When this carbon which the oxygen has found in the body of the animal or the plant is joined to the oxygen, it is turned into something which would look like oxygen itself if you could see it; but you cannot see it, however closely you look at anyone when he is breathing. It mixes with the air, and though you cannot see it, you see through it, just as you see through oxygen itself. This new kind of stuff, like oxygen, and like the stuff which comes through pipes into houses, and is burnt at the end of them, is a kind of *gas*, and the special name for it is carbonic acid gas. Every living thing, from its first moment of life to its death, breathes in oxygen and breathes out this stuff which is made of carbon and oxygen, and which is called carbonic acid gas.



This picture shows the lungs with which a plant breathes. Under the magnifying glass the little lungs of the leaf, called *stomata*, are clearly seen, and it is through these that the **leaf drinks in food from the air. We know a plant breathes because if it is shut up from air it dies of suffocation. The little circle shows the lungs larger.**

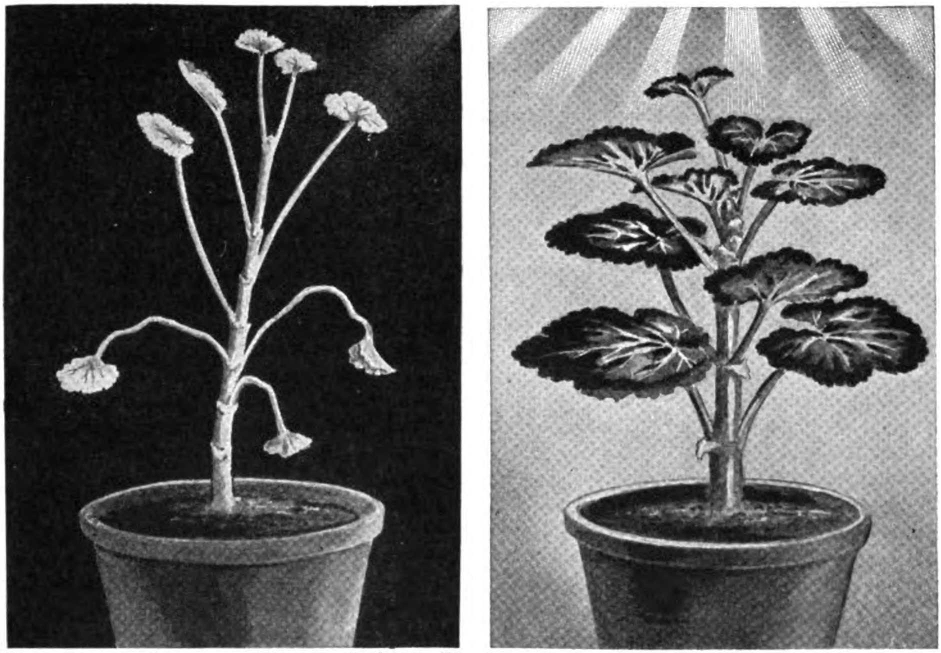
Now, plants must do this because they are living things, and they cannot live without it. But this breathing is not one of the things that a plant is very good at. Indeed, a plant breathes just as little as it can in order to keep itself alive. It is quite easy to prove that a plant must breathe to some extent, at any rate, because you can suffocate a plant as easily and certainly as you can suffocate an animal. If you keep away all oxygen from an animal, you suffocate it, and it will die, and the same is true of a plant. If it does not have enough oxygen, and have it all the time, day and night, any living thing, from a microbe up to a man, will die of suffocation.

Just because this is true of every living thing, we must not forget it in the case of the plant; but at the same time a plant needs far less oxygen than an animal, because it breathes much more slowly, and the curious thing, as we must now see, is that most plants are specially good at doing something which is just the opposite of breathing, something which no animal can do, and which every animal depends upon plants to do for it. The plants that do this wonderful thing that we are going to talk about are all green plants, or, at any rate, if they are not green, like grass, they are brown, like seaweed. But the little difference in colour does not matter, for the stuff that makes the seaweed brown is really the same as the stuff that makes grass green. This stuff is so important that we must think of all plants in the world as divided into two great kinds—those which have this green or brown stuff, and those which have not. The first kind we shall call green plants, and we must now talk about them very carefully.

Very nearly all plants are green plants, but we have already mentioned one or two that are not—such, for instance, as the mushroom. You never found a green mushroom or a green toadstool. The plants that have no green stuff in them are peculiar, so to speak. We must think of them as if they did not do what a plant ought to do; they have lost what is the most striking and important power of plants, and so for the present we can leave them out of account.

The green stuff of all other plants is really one and the same everywhere—even when it is brown, as in some seaweeds. It is the same stuff in a cabbage, a blade of grass, a leaf of a tree, or the scum of plants that forms on a still pool of water. It has a long special name, but here, I think, we need not bother ourselves with that; we may just call it green stuff.

This green stuff is most important because of what it enables the plant to do, and that is what we must now talk about. But we must begin at the beginning—and that beginning is not the green stuff itself, but the sun, the great and glorious sun. By itself the green stuff can do nothing; it is of no use to the plant, and is only a burden to it. Indeed, if plants are cut off from sunlight altogether, they die at once, or, at any rate, lose all the green stuff in them. It is the sun that makes the green stuff in the plant, and green stuff's only use, after it is made, is to help the plant to profit by the sun.



These pictures show how a plant needs light. The first shows a plant withering in the dark. In the second a plant is thriving in the sunlight. The leaves of a plant are flat and thin so that they can drink in as much sunlight as possible, and the power of the sun helps the green stuff to split up the carbonic acid gas into two parts. One of these the plant eats itself, and the other it gives back to the air quite pure.

Now, this is just a tremendous fact, and we should make a very great mistake if we went on to talk about what the green stuff does without making quite sure that we understood what the sun does. Without the sun there would be no life at all upon the earth. Just as all living things depend upon each other, and just as they could not exist unless they were always serving each other, as we saw a little while ago, so the whole company of living things depends upon the sun.

Company is a very good word, because its real meaning, as you will learn again some day, is "the people who feed together." *Com*, means with, or together, and *pany* really means bread. Your *companion* is really the little boy who *eats bread with you*. Now, all living things do their feeding with each other, with each other's help, and so we are very right in calling them a company; but without the sun none of them could feed at all, and they would all die. Indeed, it is really the light and power of the sun that we all feed upon, and the wonderful thing about the green stuff of the green plant is that, without the green stuff, we could not use the sunlight. First of all, the sun makes the green stuff in the green plant, and then uses it to feed the green plant and all other living things, including you and me, for we get all our food either from the green plants or else from the bodies of animals that live on green plants.

Without the sun there would be no life upon the earth; or, to put it very shortly and plainly, in a way that I think you ought to remember, *No Light, No life.* I do not think it has ever been put much more shortly than that, and yet, short as that is—no light, no life—it is absolutely true, and there are no exceptions to it anywhere, and never have been, and never will be.

IF THE SUN WERE TO GO OUT EVERYTHING IN THE WORLD WOULD DIE

The green stuff, then, though no life can do without it, is only an instrument, something the light uses to make life. If the sun were to go out—though there is no fear of that—all the green stuff in the world would not help us at all, and all the plants and animals would soon die. There was some excuse, you see, for the ignorant and untaught men of long ago who used to worship the sun. When we go out on a bright day and enjoy the light and warmth of the sun, we must remember that if it were not for this light and warmth we should not be here. This is true of us; it is true even of animals that live in the dark; it is true even of trees and fishes, and seaweed and microbes. Some of these creatures, like microbes, may be killed by sunlight, and they have to keep out of its way; so may we be killed by sunlight if it is too strong, and gives us sunstroke. But even microbes depend upon the sun for their life, for without the sun none of the things upon which microbes feed could possibly exist.

Now that we have learnt how important the sun is, we are ready to look at the green stuff of the green plant with a new interest, since it is the means by which light can produce life.

THE REASON WHY A LEAF IS FLAT AND THIN

You will remember that we have already spoken of the tiny specks of green stuff which give the leaf its colour. Now, this green stuff is to be found in other parts of plants besides the leaves. We know that the stem or stalk, of a rose is green. But most of the green stuff of plants is found in their leaves, and it is for the sake of the green stuff that leaves exist at all. The leaves of a plant are its tools for using the green stuff. Directly we think of a leaf we see that it is made in a particular way. It is a flat, thin thing. So much are leaves flat, thin things that we call other things which are flat and thin "leaves," though they are not parts of a plant at all—the leaves of this book, for instance. The first books were made of real leaves.

Now, there is a very good reason why leaves should be flat and thin. Leaves exist in order to expose as much green stuff as possible to the light. If a leaf were shaped like a ball, only the green stuff on the outside of it, and, indeed, only the green stuff on the side of it which was turned to the sun, could receive the sunlight. All the rest would be in darkness, and that is as good as to say that it would be quite useless. If you like, you may try to think of some kind of leaf that would expose its green matter to the sun in a better way than the leaves you know. But you will not succeed. Perhaps you never asked yourself before why a leaf is shaped like a leaf; but the question is worth asking, and the answer is that no other shape can be even thought of that would be so useful.

WHAT THE SUNLIGHT DOES WITH THE GREEN STUFF

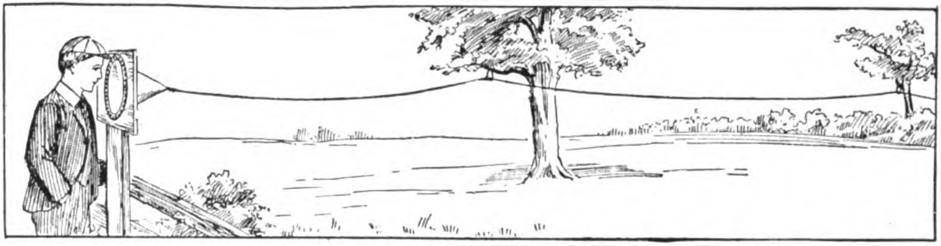
The object of a leaf is to expose as much green stuff as possible to as much sunlight as possible, and it does this perfectly. Of course, a leaf must have two sides, and if one side is exposed to the sun, the other must be in the shade. But, then, leaves are usually so very thin that the sunlight can go right through, and so none of the green stuff is wasted.

Sometimes, when leaves have to be rather thicker, you will find that as little green stuff as possible is wasted, for now almost all the green stuff is packed on to the upper side of the leaf, which is dark green; and if you turn it over you will find that the under side is hardly green at all. Green stuff is of no use where it cannot get the sunlight. But you see how well things fit in with each other, for the green stuff is made by the sunlight in the first place; it is made where the sunlight strikes the leaf, and is made just where it can be useful.

And now we come to something rather more difficult; but it is not too difficult for us, and it is very important, for it is necessary to all life. We have agreed that there is something which the green stuff does by means of the sunlight, or, better still, there is something which the sunlight does by means of the green stuff. Now, what is it?

The next part begins on page 285

THINGS TO MAKE AND THINGS TO DO



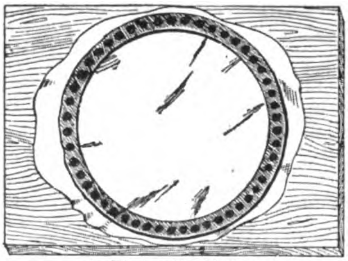
AN EASY WAY TO MAKE A TELEPHONE

CONTINUED FROM 103

To make a real telephone is a somewhat difficult task, but we can make a good telephone which will enable us to speak, in favourable conditions, up to a quarter of a mile away with very simple materials.

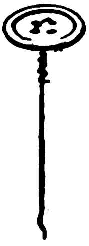
The materials we shall require include two boards about 14 inches long, 10 inches wide, and about half an inch thick. We should be able to get such boards by breaking up an empty box, and sawing up two of the boards to these sizes. Then we cut a circular hole about 8 inches across in the middle of each board. We have first to mark the holes to be cut out.

This is easily done by getting a plate about 8 inches across, laying it face downwards in the middle of the board, and marking the wood round the edge of the plate with a lead-pencil. To cut out the holes properly we should have a keyhole saw or a fret-saw; but if we do not have either of these tools we can make shift by making holes with a gimlet right round the circle we have made. The holes should be as close together as we can get them. Then by using our chisel we can cut out the circular hole. Having done this, the boards are ready, and we can put them aside until we have the other parts of our telephone ready.

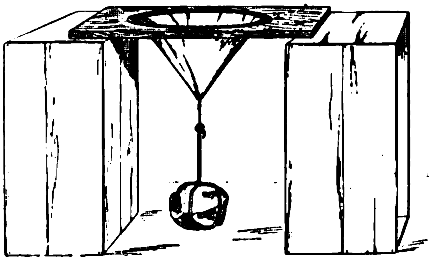


1. Fixing the bladder

Now we want two fresh beef-bladders. We blow them up hard, tie the necks with string, and put them aside for a few days to stretch. We must not leave them so long that they get dry, however. When they have stretched, we cut off the necks and soak the bladders in warm water until they are white and pliable. Then we put them over the holes in the boards we have prepared, putting the outside of the bladders to the wood. They should be put on evenly without creases, and not stretched in one direction more than in another direction.



2. Button and wire



3. Stretching the bladder

Now we take a thin leather band, or some pieces of leather which we can make into a thin leather band, and tack it all round one of the holes above the bladder as seen in picture 1. This will attach the bladder securely to the board. The tacks should have big heads, and should be driven well home. Old boot-tongues will do nicely for the leather. We cut these up into strips about half an inch wide for the purpose. We fix the two bladders in this way to the two boards in which we have cut the holes. Then the edges of the bladder outside the leather strips should be cut away.

Now take a button and attach a thin wire to it by passing the wire through two of the holes in the button, as seen in picture 2, twisting it so that it will not come out. Make a hole right in the middle of the bladder and put this wire through. Then hang something heavy—a weight of about 7 pounds, or a large stone—to the other end of the wire, as seen in picture 3, putting the board in some position so that the weight can pull down the bladder. We treat both bladders in this way, and leave them in the sun until the bladders are dry and hard.

All that remains to be done now is to fix up the two boards and bladders at a distance apart, and connect them by fixing a wire to the two wires attached to the buttons. This wire should be fine copper or tinned iron wire. The wires may need to be supported if the distance is great. This can be done by hanging loops of string to the branches of trees, or to any posts that may be in the way. Then we may speak from either end, and the words should be heard distinctly at the other end. We should speak close to the bladder. When we wish to "ring up" the other end, we tap the bladder at our end with a pencil.

A DAINTY BRUSH AND COMB BAG

Every girl should wish to make her surroundings as charming as possible; and it is easy, by giving a little time and thought, to turn an ugly room into quite a dainty place. A pretty toilet-table is such an important feature in a bedroom that we are going to learn how to make a dainty addition to it in the form of a brush and comb bag.

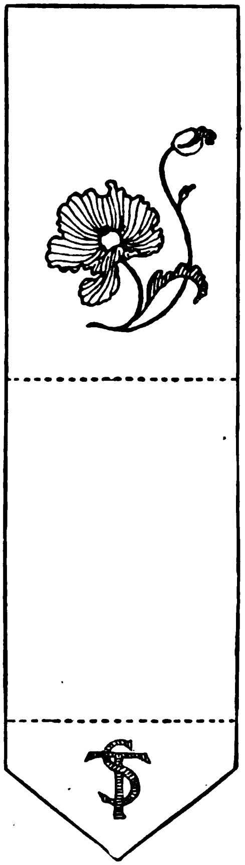
Of course, there are many kinds of such bags, and many ways of making them. You can make something quite pretty and useful from a piece of white linen at the cost of a few pence; but to-day we are going to see how to make one for "very best." It will be more elaborate, and will take a little longer to make; but everybody will agree that there is much greater pleasure in using something that we have made ourselves than something that has been bought at a shop.

The bag we are going to make is really quite simple, and should not cost more than a dollar.

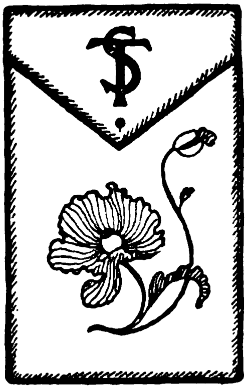
The first thing to do is to get a strip of soft white satin about 30 inches long and 8 inches wide. Tack the edges neatly with white cotton, so that they do not fray while you are working. On one end draw a pretty bunch of flowers about 3 inches from the top and about 6 inches in length. You might draw a pretty spray of poppies, with leaves, or dog roses, with foliage. If you cannot draw, you can buy a Brigg's pattern, which you can transfer to the satin.

Pin your pattern carefully in position, taking care that the bright side of the design (which is slightly raised, as you can feel by passing your finger over it) is touching the satin. Then press the paper on to the satin with a hot iron. It must not be too hot, or it will scorch the satin, or too cold, or it will not bring the pattern off. Then quickly remove the pins and lift the paper, and you will find the pattern transferred on to the satin.

If you have cnosen a poppy design, work it in the pink shades of the Shirley poppy which are so lovely. Use Pearsall's mallard floss, and work the flowers pink, and the leaves and stalks, of course, green. If you do not want to put a great deal of work into it, you can make an outline of the flowers and foliage; but the effect will be much prettier if you work the pattern all over. You must be very careful not to make the stitches too tight, or you will draw, or pucker, the satin. When this is finished, draw your monogram, or your initials twined together to form a pattern, on the other end of the satin, about 1¼ inches from the bottom. Embroider the monogram, or your initials (if you cannot draw, you can buy Brigg's initials), in pink and green, or perhaps in pink only if you prefer it.



The pattern for the bag



The bag finished

Now undo the tackings, and cut the end near the monogram either round or pointed, as you prefer.

Then take a strip of pale pink silk to match the embroidery silk, and of exactly the same size and shape as your strip of satin, and lay them together, taking care that the embroidery is inside. Tack the silk and satin together all round except at the straight end—that is, the edge where the flowers are worked, and stitch it down neatly either by hand or by machine.

If you use a machine, you must take care that it does not pucker. This can be avoided by sewing strips of paper in with your work, which can afterwards be pulled out.

Now turn your work inside out, when you will find your flowers on the right side. Sew the silk and satin at the straight end neatly over and over.

Take the embroidery, and double it over 12 inches from the end, when the sides will come together. Sew these carefully over and over, and you will find that you have a pocket with a straight piece, which must be turned over to form a flap. Then take some medium-sized pink cord to match your lining, and sew it over and over round the bag and flap, taking care to make loops of the cord at all the corners, and fastening it off neatly at a corner.

Turn down the flap, and in the centre work a buttonhole. Put a pretty, fancy button underneath the buttonhole and on the bag itself. And now you will find that you have completed a very pretty and dainty addition to your toilet-table.

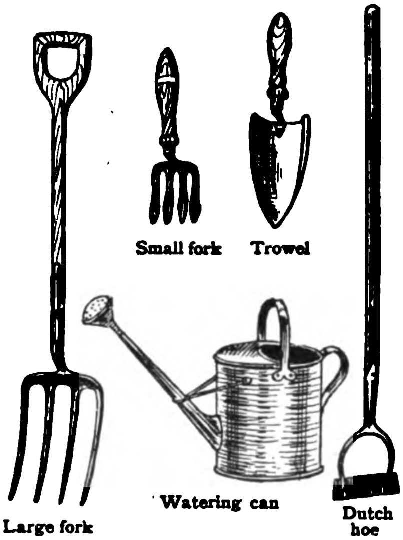
You could, of course, make it all in white, doing the embroidery with white mallard floss, when the lining and cord should be white to correspond, and the effect will be altogether charming.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF APRIL

The spring is a capital time in which to start a little garden of our own—the earlier the better, but the middle of April will do if we have not thought of it before.

Gardening is a splendid hobby, because it gives us plenty to do and plenty to think about, and plenty of wonderfully interesting things to find out. When we make a garden and plant it, we set ourselves the task—and it is a very pleasant one—of looking after the welfare and health and comfort of all sorts of plants, many of which have different tastes and requirements; and it is one of the experiments we must always be making to see if we are giving each plant just what it most wants. Some like a great deal of sunshine, some like the shady places; some like a dry position, some a moist one; some like to grow among the stones, some stretch up, and need arches or posts to support them.



THE LITTLE GARDENER'S TOOLS

After we have acquired our plot of ground, we need a supply of tools before we can transform it into a beautiful garden; and we ought to get tools as large as we can comfortably handle. This applies especially to such an important tool as the spade. Other tools that will be needed will be a hoe; and many people find what is called a "Dutch" hoe the most convenient to use for weeding.

A rake will be necessary to smooth the surface and to clear up the rubbish. Something smaller than the spade will be needed for planting, and for this purpose a trowel is useful; but where it is a question of digging holes in ground where many bulbs may lie hidden, a trowel may damage them, so that a little four-pronged fork in a handle of the same length as that of the trowel is very useful; and, if we cannot have both, the little fork will do all that the trowel does, and should be the one we should choose.

A large fork set in a handle the same length as the spade is a most useful tool, and can often be used for digging, especially round about plants already established, as it is not so likely to injure their roots as the spade. A watering-can is necessary, and one the rose of which takes off and on should be bought, as quite as often we need to water through the spout as to sprinkle the water through the rose. A wheelbarrow is useful to have, either to bring soil or to cart away weeds, leaves, and other rubbish; or, failing that, a strong basket will take its place.

The first work in the garden plot will be to dig it as deeply as you possibly can—that is one of the reasons why it is necessary to have a spade that really can do some good work, because deep digging is of the utmost importance. You can understand that the deeper you work the soil the better it is for the roots of your plants, and in well-worked soil these go creeping out in all directions to find food and drink wherewith to build up and sustain healthy and sturdy leaves and stems and flowers.

The middle of April is not too late to sow seeds of many plants that will flower during the summer and autumn. Plants that flower so quickly as this are called *annuals*. They do not come up year after year in the garden, as some plants do, and live for many seasons. No; annuals are the shortest lived of all plants, and you must sow seeds afresh each year. But an annual accomplishes a great deal in its little life. You sow the seed; the seedling appears, grows quickly into a little plant; the buds appear, and open out into beautiful flowers. Then they fade, and the seed-vessels grow; and when the seed has fully ripened the plant dies. And all within the year!

Among the prettiest and brightest of annuals are larkspurs, poppies, nasturtiums, scarlet linums, and dwarf convolvulus. The sweetest smelling is, perhaps, the mignonette, and one that is interesting for its quaint seed-vessels is known as love-in-a-mist.

The great point to remember in seed sowing is to sow as *thinly* as possible, and however thinly we sow we shall have to draw out many of the seedling plants when they appear, but we can think about that later on; though any boy or girl who already has a garden, and has reared his seedlings, may at once set about thinning them, as it cannot well be done too soon.

Some of the seeds may be sown in lines, especially where we need a row to serve as an edging; or, again, they may be sown in circles. These, when they grow up, make nice patches. There are a few rules always to be borne in mind when sowing seeds in the open ground. The soil must not be so wet that it is sticky and hangs together in lumps, neither should it be so dry that it is like powder. Secondly, the seed must not be buried too deeply; and thirdly, as already mentioned, it must be sown thinly.

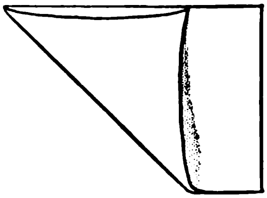
If the soil is too wet, we must wait for a few days until wind and sun have partially dried it, and if it is too dry it must be watered. It will be in splendid condition if it has a good watering the day before the seed is sown, where it has become dry and parched, as often it is on the surface during April. It is very interesting to have an especial flower for each month, and there is no doubt that *the* flower of April is the daffodil. There are many sorts of daffodils, or narcissi, as they are often called in catalogues. They need plenty of early sunshine, but not much later, and may be placed under tall trees, in grass-plots, or by house-foundations.

April is the month when we must remember to re-pot the plants we grow in the house, if they happen to need it. Ferns should be re-potted now, and great care must be taken not to injure the roots. If the plant does not leave the pot easily, then the pot must be gently tapped all round. Fresh soil should be used, and plenty of crocks or broken bits of pots should be put over the drainage hole. This is important, as it helps the water to get away, and not remain to make the soil sour.

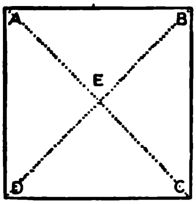
We may, perhaps. spare a small portion of our garden for vegetables, and at the same time that we sow our seeds of annuals we may also sow a line of cress. The drill should be carefully made, and the seed sown thickly.

HOW TO MAKE A PAPER BOX

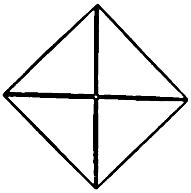
Any clever boy or girl can make a neat paper box. First, take a piece of paper, which should not be too thin or too soft. A piece the size of this page or a little smaller will do nicely. Now make the paper exactly square. You can do so easily by folding it over as shown here. Cut off the part where the folded upper piece does not cover the lower piece, and what remains will be exactly square.



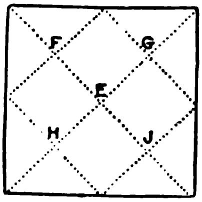
You have already folded the paper diagonally—that is, from corner to corner. Make a good crease by pressing it with the fingers at the fold, then open it out and fold it diagonally from the other corners, and press the fold well down with the fingers. The paper will now be square and creased as in this picture.



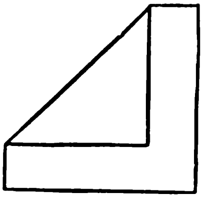
Notice the letters on the picture, so that you can understand easily what to do. So that we may understand what follows more easily, we shall call the four corners A, B, C, and D, and the centre will be E. Now fold all the corners in carefully so as to touch the centre, and make the paper as here shown.



The paper will now be in the form of a square, but a much smaller square than formerly. Having folded it like this, press it down well at the folds so as to crease it plainly.

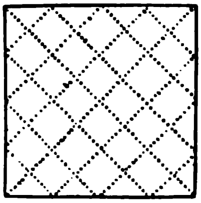


You will now have four more creases, and when you open out the paper again it will be creased where the dotted lines are in the next illustration. The other letters—F, G, H, J — mark where the creases cross. Fold the corner A over to the spot J, as seen in this illustration.



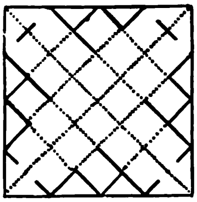
That will make another crease. Now make another crease by folding the corner B over to H; another by folding the corner C over to F; and another by folding the corner D over to G.

We still want four more creases. Make them by folding A over to F, B over to G, C over to J, and D over to H. The paper is now creased as shown here.

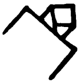


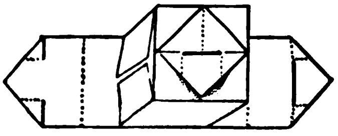
Every one of these creases is necessary to make the final box, although, as the paper is now, it is not easy to see why all these marks are wanted. But we shall see presently the use of all the creases.

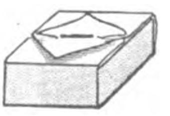
Now you must use scissors. Cut along where there are black lines instead of dotted lines in the next picture.



You now have a paper which does not look very like a box. But you have only to fold it up in the proper way, and you will see that it is. Fold over the corner at D like this: and slip it into the slit near B. Now fold in the flaps at the side, and you have it like this:



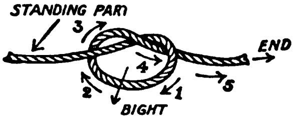




Fold over the corner at C, and slip it into the slit at A, and the box is now finished. If you have made it properly, it will be very neat and perfectly regular.

HOW THE SAILOR TIES HIS KNOTS

THERE is usually a time in the life of every boy when he wants to be a sailor. Every boy cannot be a sailor; but one part of a sailor's duties is very interesting, and a knowledge of it is likely to prove useful even to boys and men who are not sailors. That part is the making of knots and hitches and the splicing of ropes It is easy to learn how to do these things. All that is required is a few pieces of string, a stick or a rod of wood or metal to serve the purpose of what sailors call a marlinespike, or a handspike, which is used for some knots, and a little attention.



Simple knot

The first knot is the simple or overhand knot, seen in the first picture. We notice in the picture that one end of the rope is marked "standing part," the other end is simply marked "end," and the loop is marked "bight." We must remember these names, as we shall use them frequently in our descriptions of knots. The standing part means the part of the rope not right at the end, but a little way up, and in making a knot we always bend the end round the standing part. In some knots we use only one end of a rope; in other knots we use two ropes or the two ends of one rope, and in this case there are two ends and two standing parts. Sailors call a coil or a loop in a rope a bight. Also notice that in our illustrations we have small figures where there are arrows. These arrows indicate how the string or rope is threaded to make the knot or hitch; and we must follow the arrows according to the figure beside it—2 coming after 1, 3 after 2, and so on.

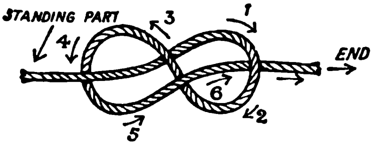
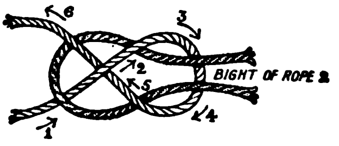
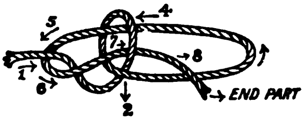


Figure of eight

The next knot is what is called the "figure of eight," and from its appearance we can see that the name is appropriate. In making it, we pass the end ot the rope round the standing part, then over "its own part" and through the bight. We understand what is meant by "the standing part"; and the words "its own part" mean the part of the rope or string that we have already bent around.



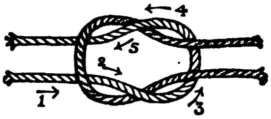
Common sheet bend



Common bowline

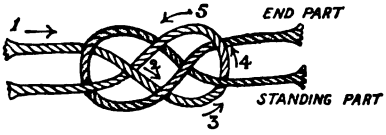
The next knot is what sailors call the common sheet bend. It is made with two ropes or with two ends of the same rope. We form a bight with the first end, and pass the other end through this bight, then right over both parts of the first rope, and then under its own part. By passing the second end under its own part, we jam it against the edge of the bight and prevent it slipping.

The next is called the common bowline, and is a little more difficult than any we have yet seen. We must follow the daggers in their proper order very carefully. It is made with one rope or one end. Some little distance from the end of the rope we form a bight with a half-twist, thereby making a loop. We pass the end up through this loop, round the standing part, and down again through the loop.



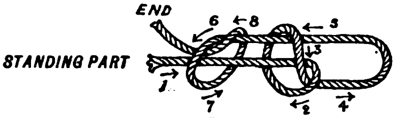
Reef knot

The next, probably the most valuable knot of all, is the reef knot. It is commonly used in joining two ropes or two ends of one rope. We make a bight of the first end with the end and the standing part side by side. Then we pass the other end up through the bight, round both parts of the first end, and down through the bight again. Another way to make it is to pass the first end round the second end, then bring the two ends back to their standing parts, passing one part round the other so that two parts of each rope pass through the bight in the same direction. If we are not very careful, we shall make the ends come out one under and one over the bight, thereby making a granny knot, which is apt to slip.



Carrick bend

The next picture shows the Carrick bend, which is also rather complicated. It is made with two ropes or with the two ends of one rope. We first make a bight of end No. 1, then pass the end of No. 2 through the bight, over the end of No. 1, round the standing part of No. 1, over the standing part of No. 2, and through the bight again.

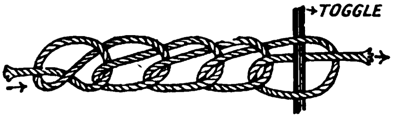


Flemish loop

both parts coming out of the bight at different sides. The figures in the picture must be followed carefully in making it.

Now we come to the Flemish loop, which is made with one end only. First we make a common slip knot, and then, with the end, make an overhand knot round the standing part away from the loop.

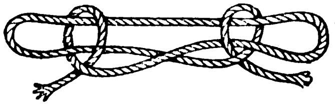
The next illustration is what sailors know as the chain knot and toggle. It is really a number of common slip knots, which many schoolboys know as the drummer's knot, or the rat's tail. The toggle is the bar which is passed through the end loop. The chain knot is made by making a bight on the rope and crossing it. Then we pass a hand through the bight and catch the standing part, which we pull through, forming a loop.



Chain knot and toggle

We repeat this to make as many loops in the chain as we may think we want. Then we pass the bar, or toggle, through the last loop, and haul on the end to tighten up all the loops.

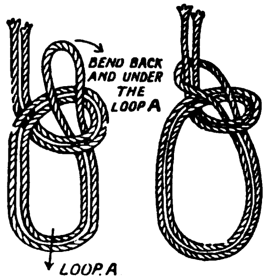
The next is a sheepshank, in the language of sailors. It is generally used to shorten a rope on which there is a strain. A piece of the middle of the rope is held so as to form three parallel strands, or two bights. Round the end of each bight we make a hitch with the part leading to the end. As long as there is a strain the knots hold securely. When we wish to let the rope out again to its full length, one of the long ends of the bight can be prised out, or one of the hitches slackened, and the rope withdrawn.



Sheepshank

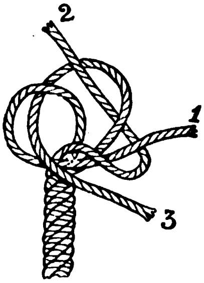
The next is what is properly termed a bowline on a bight; and, to indicate clearly how to make it, there are two pictures, one showing it half made and the other showing it completed. We double the rope, and make a bight with it doubled. Then we pass the doubled end under, and up through the bight, and back over the whole loop, and up to the part above the bight. The picture shows more clearly than words how this is done.

The wall knot is a neat way of finishing off a rope and of preventing it from unlaying, or coming apart. It is made in two stages. We untwist the three strands of which the rope is made for a distance sufficient to give us three cords about 8 inches long. Let us call these strands Nos. 1, 2, and 3. We make a bight with strand No. 1 and pass strand No. 2 round the end of it; then we pass strand No. 3 round the end of No. 2 and through the bight of No. 1. Finally we haul the ends tight, shaping the knot evenly with the fingers as we do it. The wall knot requires a little practice to do it neatly, but it is not so difficult as it looks.

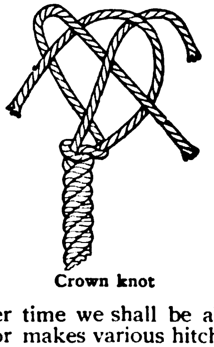


Bowline on a bight

The crown knot is the wall knot carried a little further. We make a wall knot as already described, and then take strand No. 1 over the centre of the wall. Now we place strand No. 2 over No. 1. and strand No. 3 over No. 2 and under No. 1. Then we pull them all tight, shaping the end with the fingers as we do so, and the crown is complete.



Wall knot



Crown knot

At another time we shall be able to learn how a sailor makes various hitches and also how he splices the ends of two ropes together.

GAMES TO PLAY SITTING BY THE FIRE

No boy or girl need ever be dull on a dark night or a rainy day. There are hundreds of ways of enjoying ourselves by the fireside, and here are some games that we can play as we sit, even without moving from our chairs.

BUZ

Players take it in turn to count up to 100, but instead of saying "seven" the word "Buz" must be used, and repeated at fourteen, twenty-one, and all the multiples of seven. If "Bang" be used also at every fifth interval, someone will surely have to pay forfeit.

RHYMES

The player at one end of our row says: "I'm thinking of a word that rhymes with *rip*" (though any word may be chosen). Then each in turn tries to guess what the word is by asking a question, thus: "Is it something that sails on the sea?" If wrong the thinker replies: "No; not a ship." Another perhaps asks: "Do we partly speak with it?" "No; not *lip*." "Can we do it with a rope?" cries a third. "Yes," answers the thinker, "the word is *skip*." Then the guesser chooses a word, and the game begins again.

HOW, WHEN, AND WHERE?

One of the party must leave the room while the rest select a word to be guessed. The player is then called back and begins the task of finding the word by asking each of the party the three questions: How do you like it? When do you like it? And where do you like it? Supposing the word to be a simple name like "tea" or "sugar," the answers will soon reveal it; but the game can be made more difficult by choosing a word with two meanings, such as "pen." This may either mean the little tool we write with, or the pen that sheep are folded in.

I LOVE MY LOVE

Whoever sits first in the row is A, and says: "I love my love with an A, because he is affable" (or anything nice beginning with the first letter of the alphabet). "I hate him with an A, because he is artful" (or something else *not* nice). "He took me to Aden and gave me some apples. His name is Andrew, and he comes from Aberdeen." Of course, these last descriptions of "my love" may vary as the player wishes, just as the first do. The next player uses words beginning with a B, and so on down to Z.

RUSSIAN GOSSIP

This game will show you how easily a story grows. No. 1 whispers to No. 2 a short sentence. No. 2 repeats it to No. 3, adding an adjective or an adverb. No. 3, in telling it to No. 4, adds another word, and when the story reaches the last player he, or she, repeats it aloud. You will be surprised to find how the story has grown since starting from No. 1.

SPELLING BEE

This is a game for clever children. The first player begins a word, which he does not tell, starting with A, the second player adds a letter, and all the other players do so in turn. The player ending a word drops out or pays forfeit.

Suppose the first player says T, the second R, the third E. Now comes the critical moment; if the fourth player says E, he finishes a word—Tree. But if he is clever he will say A, and then the fifth player may, perhaps, say T. But he need not do so, as he can say S, leaving the next player to say U. Then the next might say R, and the next E, which would end the word Treasure. If the eighth player is clever, however, he will say I instead of E, so that the tenth player must make the word Treasuring or Treasuries.

The great point of the game is to keep a word up as long as possible, but, of course, some words must end. No proper names are allowed, and it is best not to count words of three letters. The game should be played through from A to Z, the first word beginning with A, the second with B, and so on.

HIDE AND SEEK ON THE HEARTHRUG

One of the players is counted out to go and hide, but, without leaving the circle, thinks of some good place in which it may be supposed he or she is hiding. Having called "Cuckoo!" the others begin guessing one spot after another until the right one is hit upon, when the guesser hides in turn. In such a game the hiding ground may be anywhere in the world: "A street in Paris," or "The top of Pike's Peak." Each player takes it in turn to ask questions as to the whereabouts and nature of the hiding place; but as the one who is answering may only say "Yes" or "No," the seekers may have a long search. It is their business to question the hidden one so that his answers, "Yes" or "No," give some idea of the place. For example, they will naturally ask whether it is far or near, high or low, and so on.

LITTLE PROBLEMS FOR CLEVER PEOPLE

OUR fathers and mothers have spent many hours — perhaps days, perhaps weeks — of their lives in puzzling over problems and trying to find out riddles. We shall find in this part of our book some of the things that have puzzled them, with many new puzzles that we can work out for ourselves. There are many puzzles so strange and bewildering that thousands and thousands of people have never been able to understand them. Perhaps your father and mother may have been puzzled by these; but we shall try to make them so clear by pictures and simple answers that we shall all understand. The answers to the following problems are in the part of our book beginning on page 239.

1. DID GEORGE WALK ROUND THE MONKEY?

George was trying to tease the monkey which was seated on the top of a barrel-organ. But, although he walked all round the barrel-organ, the monkey always turned so as to face the boy the whole time.

When the boy has walked round the organ, has he walked round the monkey?

2. HOW MANY APPLES DID MABEL BUY?

Mabel bought some apples at three for 6 cts., and an equal number of 1 ct. oranges. If she spent 14 cts. altogether how many apples and oranges did she buy?

3. HOW DOES MARY GET THE EGGS?

Alice and Mary gather the eggs on the farm. One morning Alice discovers that several eggs have been laid on a small square island in the middle of a square pond, and, having no plank long enough to reach across, she leaves the eggs alone.

Mary sees them the next morning, and, looking round for a means to reach the island, finds two planks, neither of which will quite reach from the edge of the pond to the island. But they are her only means of access to the eggs, and, placing them so that she can step across them, Mary reaches the island and takes the eggs home in her basket. How does Mary reach the island?

4. WHO IS TOM'S UNCLE'S SISTER?

"Father, Tom says his uncle's sister is not his aunt." "Well, I expect he is right." If Tom's uncle's sister is not Tom's aunt, who is she?

5. HOW MANY STAMPS HAD THEY?

Three children — Jack, Frank, and Harry — divided some postage-stamps amongst them. Jack had half of them and one more; Frank had one more than half of those left; Harry had the remaining three. How many stamps were there?

6. HOW LONG WAS THE STRING?

A boy had two pieces of string, one of which was just twice as long as the other. He cut 6 inches off each piece, and then found that one was just three times as long as the other. How long were they at first?

7. WHOSE PORTRAIT IS IT?

One of the problems that have most puzzled our fathers and mothers is the old problem of a man looking at a portrait, saying: "Brothers and sisters have I none, but this man's father is my father's son." Whose portrait is it?

8. WHAT DID THE CORK COST?

A bottle and a cork cost 5 cts. If the bottle cost 4 cts. more than the cork, how much does the cork cost?

9. HOW MANY GIRLS ARE THERE?

If $14.50 is divided among fifty children, the girls getting 25 cts. each and the boys 30 cts., how many girls are there?

10. THE MISSING CANARIES

Grandfather gave a children's party at which twenty little guests were present. The old gentleman had prepared a surprise for the children, each of whom was to receive a live canary. But when the time came to present the canaries it was found that many of them had flown. The host sent out for others to replace them, saying to the messenger: "Bring back as many and half as many — that is, one and a half times as many — as there are left in the cage, and two and a half more.

When the messenger came back with these there were enough birds to go round, making twenty in all. How many canaries flew away.

11. HOW FAST WAS THE HORSE WALKING?

I was walking along a country road steadily at the rate of four miles an hour. I saw a horse and cart going in the same direction, and when I saw them they were exactly 220 yards in front of me. I overtook them in 15 minutes. At what rate was the horse walking?

12. HOW MUCH DOES A BRICK WEIGH?

A brick weighs six pounds and half of its own weight. What is the weight of the brick?

13. HOW MUCH ARE EGGS?

"What are eggs a dozen?" Mary asked.

"Two more for 24 cts.," said the grocer, would make them 2 cts. per dozen less."

"Then," said Mary, "I will take 24 cts. worth." How many did she buy?

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 238, and below are answers to the problems appearing on that page.

THE CLOCK STRIKES TWELVE

14. George and his sister stood under the church tower and heard the clock strike six. George looked at his watch while it did so, and said to his sister: "It took thirty seconds to strike six." His sister replied: "Then how long would it take to strike twelve?" George replied: "Sixty seconds, of course!" George was wrong. What is the correct answer?

HOW DID HE MEASURE THE MILK?

15. Mrs. Thomson ordered four quarts of milk from her milkman, who had eight quarts in his can, but no measure by which he could measure it. Mrs. Thomson had two jugs, one able to hold five quarts and the other three quarts. The milkman said that he could not measure four quarts with these, but Mrs. Thomson's little boy, Charlie, showed him how to do it. How did he do it?

HOW MANY EGGS?

16. If a hen and a half lays an egg and a half in a day and a half, how many eggs will one hen lay in six days?

TWELVE EGGS IN BASIN

17. There are 12 boys, and on the table is a basin with 12 eggs. Each boy took one egg, and there remained one egg in the basin. How was this?

THE FARMER AND THE TRAMP

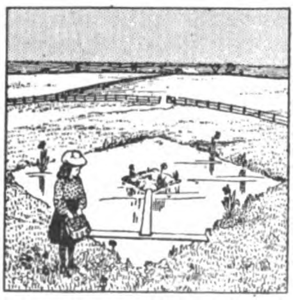
18. A tramp lies down for a nap at the side of a haystack, and hears the farmer approaching. He runs round and round the stack, chased by the farmer. They start from opposite corners, the tramp taking forty seconds to run completely round, and the farmer thirty seconds. How often must the farmer run round before catching the tramp?

THE ANSWERS TO THE PROBLEMS ON PAGE 238

1. No; George never sees the monkey's back, which he clearly would do if he walked round the monkey.

2. Mabel bought six apples, which cost 8 cts., and six oranges at 1 cent each, making 6 cts. for the oranges and 14 cts. for the whole. The simplest way to find this is to count what she paid for three of each, which would be 4 cts. and 3 cts., making 7 cts.; and 14 cts. is exactly double 7 cts., so she would get twice three of each for 14c.

3. Mary put the planks as shown in the picture, and thus reached the island.



How Mary got the eggs

4. Tom's uncle's sister was Tom's mother.

5. This one is not so easy as the others. Let us find first how many stamps were left when Jack had taken his share. Seeing that Frank had one more than half, Harry must have had one less than half. You know that Harry had three, therefore four must have been half the quantity that Harry and Frank divided. Four is the half of eight, so that Frank had five, which is one more than half of eight. Now we must find how many Jack had. Jack's share was one more than half of the total quantity, and therefore the quantity divided by Frank and Harry must have been one fewer than half of the total. Frank and Harry's share came to eight, as we have seen; and the half of the total quantity, being one more than eight, was nine. Jack had ten, which is one more than half of the total quantity, and there were thus eighteen stamps altogether.

6. To begin with, one piece of string was 12in. long and the other piece 24in. After cutting 6in. off each, the shorter piece was 6in. long and the longer piece 18in. long.

7. If a man says that he has no brothers and sisters, his father would have only one son—himself. Thus, if what he says is put in simple language, it is: "That man's father is myself." This means that the picture at which he looked was that of his own son.

8. You have probably guessed that the cork cost 1 cent, which is wrong. Since the bottle cost 4 cts. more than the cork, if we take away 4 cts. it leaves 1 cent to be divided between bottle and cork, which is ½ cent for each. The cork, then, cost ½ cent.

9. Suppose we first give each of the children 25 cents. This will use $12.50. We have $2 left, to be used in giving another 5c. each to the boys. Now there are 40 5c. pieces in $2, so there must be 40 boys. Therefore there are 10 girls.

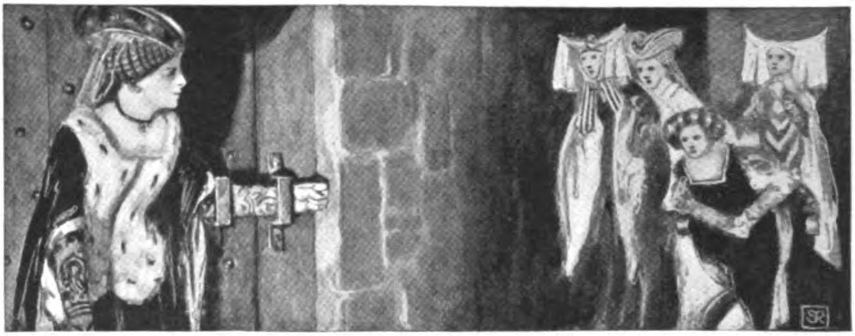
10. The messenger brought 2½ canaries, and 1½ times as many as there were left in the cage. Counting those in the cage, then, there were 2½ times as many as were left, and 2½ canaries. But there were 20 altogether. Taking away the 2½ canaries, we see that 17½ canaries is 2½ times as many as were left in the cage. Or, what is the same thing, 35 canaries is 5 times as many as were left in the cage. There were 7 left in the cage; and so there were 13 which flew away.

11. In fifteen minutes I had gone 1 mile, and the horse 220 yards less than 1 mile. In one hour the horse would walk 880 yards less than 4 miles—that is, 3½ miles in one hour.

12. The brick weighed 12lb. The weight of each of two halves is the same, so that if a brick weighs half its own weight and 6lb., the 6lb. must represent the other half.

13. She got 16 for 24 cts., being 18 cts. per dozen. Had there been 18 for 24 cts., the price would have been 16 cts. per dozen.

The next Things to Make and Things to Do begin on page 333



KATE BARLASS OF THE BROKEN ARM

CONTINUED FROM 129

King James the First of Scotland was a good king; but when he came to the throne, nearly 500 years ago, the country was in such disorder that he had to be very stern and severe to keep the powerful nobles from wrong-doing; therefore many of them were full of hatred towards him. Then certain of these, headed by Sir Robert Grahame, conspired together to slay the king.

Now, it happened that the king went one winter to the town of Perth to hold high festival, with his queen and some of her ladies, and abode in the Abbey of Perth, while his followers were scattered over the city; and here the traitors got their chance of catching him unguarded. To make matters easier, some servants were bribed to remove the bolts and bars from the doors. And so it befell one night, when all the king's men had gone from the abbey, and he was sitting unarmed with the queen and her ladies, that a great clatter of weapons was heard without. Thereupon he guessed that his foes had gathered to murder him, nor could he fight them, being himself unarmed. But, as he knew that there was a vault under the chamber where he was, he wrenched up boards from the floor, and leaped down; and the ladies quickly put back the boards and covered them just before the traitors rushed into the room. And they, not finding him, searched for him high and low. Then the king and the ladies in the chamber, seeing that the danger was passed, began to move the boards, so that James might come out again. And, even at that moment, they heard the clatter and clash of arms again. For one of the traitors had bethought himself of that vault, and they were hurrying back. What chance of escape was there for the king? There would be no time to cover all up before the conspirators broke in; and on the door was no lock or bolt to stay them—only the iron rings where the bolt should be.

Quick as thought, one of the queen's maidens, named Katherine Douglas, sprang to the door and thrust her arm through the rings on the door, crying out that the men must not enter, since there were none in the room but ladies who were disrobing. But the fierce men outside paid no heed to that, and beat upon the door; and how should a maiden's frail arm suffice for a bolt against their battering? Alas, poor Katherine's arm was snapped, and the wicked men burst in, and, seeing where the floor had been disturbed, leaped down and slew the king.

For that brave deed of hers, all in vain though it was, the name of Katherine Douglas was repeated in story and song through the land, and men called her Kate Barlass—the maid who barred the door with her tender arm, that so, if it were possible, she might save the good king's life.

ALCOHOL, THE ENEMY OF LIFE

ALCOHOL, the product of the fermentation of sugar by the yeast plant, forms part of the daily diet of many people, and is consumed in this country in enormous quantities. In various parts of the world, and very notably our own country, huge areas of the land that might be growing wheat are devoted to the growing of plants of one kind or another which produce a quantity either of sugar, or of starch that can readily be turned into sugar, for the making of alcohol.

When we study the effects of alcohol upon the body, and especially upon the bodies of children, there is also a particular point that everyone ought to know and remember. In this country we spend more than $1,000,000,000 a year on alcoholic drinks.

It can easily be shown that the expenditure of this huge sum on drink means not merely the loss of so much money. If we took it all and threw it into the sea every year, we should be a thousand times better off. As it is, we buy death, and disease, and crime, and poverty, and insanity, and cruelty to children, all of them in rich abundance, with this money. Wealth is either life or what serves life, and *illth* is what injures life. But men take the land, and the sunshine, and the water, and the air, which ought to be essential wealth, because they build up life, and with these they grow grapes, and barley, and so forth, which they turn into all these horrible things.

We grow death where we should be growing life, and our deadly crop never fails. However, we are going to study that more carefully later. Meanwhile, let us just remember that what we spend on drink would buy us a hundred battleships every year. What it does buy us, we shall see.

It is true of every living creature, without any exception, that any poisonous substance is more injurious to it when it is young than when it is grown up. It is not because the creature is smaller, and not because it is growing or getting bigger, but because it is developing. There is all the difference in the world, we know, between growing and developing. Anything that is developing is delicate, and if we have the least idea of what a miracle development is, we can well believe that it should be so. Now, we all know that tobacco and alcohol are poisons. There is no form of life, animal or vegetable, that they will not destroy.

Consumption in its various forms causes nothing like so many deaths as alcohol; but of all the things that we call disease it is the most deadly. It is what is called "catching." It is due, we know, to microbes, and these spread from one person to another. It used to be supposed that children did not suffer much from consumption, but we know now that they do. The amount of consumption among young school children, and, indeed, at any time after the first year, is terribly high in this country.

Fortunately for mankind, we do not always catch diseases even when the microbes that make them enter our bodies. The microbes are the seed, but our bodies are the soil, and the seed cannot grow if the soil is not suitable. In the case of consumption nothing seems to make the soil so suitable for the deadly seed as the breathing of foul air. That, of course, is why we should always sleep with our bedroom windows open.

HOW THE DRINKING OF ALCOHOL HELPS TO SPREAD CONSUMPTION

One other thing will make the soil readier still for the deadly seed to grow in, and that is to prepare it with alcohol. It is still supposed by ignorant persons that alcohol opposes consumption. We know that the exact reverse is true. In France it has been proved that wherever the amount of alcohol drunk is high, the amount of consumption is high; and where it is low, the amount of consumption is low. One district, which consumes just about three times as much alcohol as another, has rather more than three times the death-rate from consumption.

Now, it has been generally supposed that children do not get alcohol to drink in this country; that even those who are taken into bar-rooms very rarely get any alcohol given to them. But we are learning that this is not the case, and that the state of things here is not so very different from that which has been known for some time in Europe.

In Germany and Austria the most serious alarms have lately been caused by the discovery that not merely women — which means mothers — but also children take far more alcohol than used to be supposed. Of the total number of school children in Vienna, one in three drinks beer regularly, one in twenty drinks wine, and one in thirty drinks spirits. In a large German town a government doctor, studying more than four thousand children, found that 71 per cent. drank beer or wine daily. In a class of seventy-one children between seven and nine years of age, twenty-one had drunk brandy.

THE MILLIONS OF SCHOOL CHILDREN WHO ARE ALLOWED TO DRINK ALCOHOL

Quite lately careful inquiries have been made in England to see whether the same thing is to be found there. In several infant schools in London over 40 per cent. of the infants of both sexes drink alcohol more or less regularly. As far as the present inquiry has gone, it is probable that there are nearly 300,000 child drinkers in London, and some 2,000,000 elementary school children in England and Wales who more or less regularly drink alcohol.

There is a very clear rule about alcohol, and other substances like it, in the way they act upon the body. It is, first, that the younger and the farther from its grown-up state the creature is, the more is it affected by the poison. That, of course, we can understand. The earlier the period of development, the more serious is a wrong step; the farther, so to speak, the creature will go out of its right way.

THE BRAIN THAT IS MORE WONDERFUL THAN ANYTHING ELSE IN THE UNIVERSE

The second point is that alcohol and other substances like it affect the body, whether developing or already grown up, in a certain precise order. Our bodies are made up of many parts, some of which we may look upon as older than others, and those which are older we must also look upon as lower. The backbone, for instance, is very old, for we know it is as old as the fishes; parts of the brain are very old, but we can trace in the brain, quite clearly, newer parts which are higher in their duties and more easily upset. There is, indeed, a part of the brain which is often called the new brain. It is by far the most wonderful thing in the whole universe, so far as we know it, and we shall study it later. Meanwhile, the point is that the newest and highest parts of the brain are also the most delicate. They are the most likely to be injured by anything when we are grown up, and if anything interferes with development, they will be the most certain to suffer. The same is true of injury done by old age or by disease; *the last to come is the first to go.*

"Last to come" has a double meaning, because it applies both to the race to which we belong, and to ourselves as individuals. The parts and powers of the brain that develop last in ourselves, as we grow up, are those that have developed last in the history of the great line to which we belong.

THE GREAT LAW THAT THE LAST TO COME IS THE FIRST TO GO

The rule is that when the individual is damaged in development, or is poisoned by anything that acts at all upon the brain, or grows old and begins to go downhill, as we say, that which last came is the first to go. On the other hand, the very oldest part of the brain, such as the part by which we breathe, is the least delicate. It is the first to come and the last to go. Every other part of a man's brain may have been practically destroyed, and he may be quite unconscious from a huge dose of alcohol, but the part of his brain which makes him breathe will hold on to the last; until, perhaps, the alcohol poisons even that, and then he dies.

This law about the different levels of the brain ought to be known by every intelligent person in the world, because it is the greatest discovery ever made in this branch of science. It was made by an Englishman, Dr. Hughlings Jackson, who is still alive.

Alcohol perfectly illustrates Jackson's law in every part of it. When young children are exposed to the effects of alcohol, their development is interfered with most in its highest parts. That is the terrible thing about alcohol, and other substances like it, that they strike at us where we are most human, and interfere less with the least human parts of us. There are some hundreds of thousands of persons in America to-day, of all ages, whose brains and minds have not properly developed. The most moderate figure is about a quarter of a million, but we know that that is far under the real facts. The lives of these persons are worth nothing to themselves and much less than nothing to us.

THE CELLS OF OUR BRAINS THAT CAN NEVER BE REPAIRED

We, of course, have to pay for their keep, and for all sorts of terrible evils, like crime, and drunkenness, and cruelty to children, which flow from the existence of these people. They all illustrate the truth of Jackson's law. The highest, the latest, the most delicate, the most human part of their brains has been injured, but they breathe as well as we do. No power on earth can repair this injury. It is one of the most remarkable facts about the brain, or, indeed, about nerve-cells anywhere, that once destroyed they are destroyed for ever. No new nerve-cells can be made beyond those with which we are born, and no damaged nerve-cell ever recovers. Now, alcohol is very largely responsible for the making, and for the existence, of these unfortunate children and grown-up people; and all of them are so many terrible illustrations of Jackson's law.

Jackson's law applies in just the same way to cases where people of any age take a large enough dose of alcohol to affect their brains. They may do themselves no permanent harm, but while the brain is under the influence of alcohol we find that the last to come is the first to be affected, and to be the most affected. Now, it is very interesting for us to ask ourselves what it is in our brains and minds that is the very highest and latest thing.

THE POWER OF SELF-CONTROL THAT MAKES MAN HIGHER THAN THE ANIMALS

What is it that a child learns last and finds most difficult to learn? What is it that some grown-up people have never learnt? What is it that makes the difference between the highest type of man whom we can trust always, and always be sure of, and other people of whom we cannot be so sure? It is not the power to move one's body, certainly, nor is it the power to see and hear, nor yet the power to speak. It is not even the power to think, though people are apt to suppose so until they look into the matter. It is *self-control.* In creatures other than man there is almost no self-control. We may watch them at a zoological garden, year in, year out, and we shall find no signs of it. If we train one of the most intelligent of all animals, such as the dog, it is only fair to say that we find the beginnings of self-control there; but that, of course, is with man's help. The greatest thing in us — apart from love, which is greater in one sense — is the power to say "No"; the power not to yield to this, or that, or the other, because of some consideration which we have in our minds, and which we regard as of higher importance.

Now, it is the mark of savages — by which we mean real savages, not highly educated and cultured people like Indians and Chinese, whose ancestors were civilised thousands of years before ours were — that they have very little self-control. They act quickly, impulsively, as we say. The highest part of the brain is not so well developed in savages as it is in us. In children, self-control is not an easy thing.

WHY CHILDREN CRY AND GROWN-UP PEOPLE DO NOT

When a child is hurt, it cries. Older people may be hurt just as much, but usually they do not cry. The brain has learnt how to control the tears. In the same way children will laugh more readily than grown-up people, and often they find it very difficult to help laughing at times when it is not at all polite to other people to do so. Now, lack of self-control is the most certain and constant mark of defective-minded people of all kinds, and it is the first and most certain mark of poisoning by alcohol, and other things of that class, that they strike at the most human thing in us; the last to come and the first to go. People who could keep their temper without alcohol lose their temper under its influence; they start laughing or crying, and cannot stop, at things which would not have made them either laugh or cry when they were all right; they do rash things when anyone puts the idea into their heads; they lose their caution and their judgment; they say things that they would not usually have said. We commonly suppose that the first effects of alcohol are when the muscles of a man's body are affected. But that is a great mistake. The first effect of poisons of this kind is shown upon the highest parts of the brain, which have nothing to do directly with any muscles.

HOW ALCOHOL SPOILS THE HIGHEST POWERS OF MAN

It is only later that the levels of the brain which work the muscles are affected, and always the law of Jackson holds good, and these parts of the brain are affected less than the parts above them. The latest and most delicate movements are affected first. The most human movements, so to speak, are those of the thumb, and these are injured very quickly, as the writing shows, or any kind of delicate movement in which the thumb is concerned. Then the delicate movements of speech are affected, and next the delicate movements by which the two eyes work together. Under the influence of alcohol they work separately, so that the person sees double. Afterwards, the coarser movements, such as those of walking, are affected; but, as we have already learnt, the movements of breathing remain to the last.

HOW ALCOHOL DEADENS THE SENSE OF RIGHT AND WRONG

People who drink alcohol lose the sense of right and wrong. They tell long stories about things that never happened, and exaggerate so that you never tell when they are speaking the truth. At first this loss of the moral sense is hardly noticeable, but gradually it increases until at last all sense of responsibility and duty is swept away. "The cries of cold and hungry children make no impression on a brain dazed with alcohol, and no emotion of affection or desire to protect is aroused by the cry of a suffering child." Indeed, men under the influence of liquor will often strike or cruelly beat their own little ones. It is a fact well known to workers among the poor that the greatest barrier to their efforts to uplift the people is alcohol. It deadens all higher thought and kills the desire to become neat and cleanly and healthful.

SUICIDE AS AN EFFECT OF ALCOHOL

Alcohol has the most depressing effect upon the brain. The short period of brightness and excitement produced by it soon passes away and is usually followed by a long fit of the "blues." While the body is trying to come back to its normal condition, people sometimes take their own lives in what is termed a spell of temporary insanity. It is the opinion of one doctor that alcohol is to blame for many tragic deaths among young men and women. It is reported that out of two hundred and twenty attempts at suicide three-fourths of the number were more or less under the influence of liquor.

So long as the effect of the alcohol is in the system people look at life from an unnatural point of view. They are subject to jealousy, to fits of rage, and usually very quarrelsome. As a consequence, they do all sorts of foolish and wrong things.

None of this is very pleasant reading if we think of it as what happens every day to thousands of persons. But just now we must look at it from the point of view of the wonderful history and building of our brains, and of the law of Dr. Jackson, which teaches how the history of the brain tells in its behaviour when anything injures it.

The Child's Book of SCHOOL LESSONS

WHAT OUR LESSONS WILL TEACH US

WE shall not learn in our book all that we must know when we are grown up and go to school, but we shall begin to learn many things which will help us at school and help to make us useful when we grow up. Everything we read in the CHILDREN'S ENCYCLOPÆDIA will be useful to us and make our school life easier, but in this part we shall learn some special things. We shall learn what figures are, and the wonderful things that can be done with them. We shall try to draw pictures of the things we see at home and in the streets. We shall learn how to read and write, so that we can read the story-books ourselves and write letters to our friends. We shall find out all about music and what a beautiful thing it is, so that we can learn to play the piano and sing; and those who are learning French will find here little stories written in French which they will be able to read and understand. All these useful things we shall learn just as if this were our school, and we shall find them as interesting as real stories.

WORD-BUILDING

HOW TO LEARN THE A B C

BEFORE we can read our story-books ourselves we must learn our letters. Then, when we have learned these, we shall be able to make words and read them, and when we can read we shall find that nothing in the world brings us more happiness than reading books.

There are twenty-six letters in the alphabet, and we can write them in two ways, because sometimes we want to write them big and sometimes little. Here they are all together, the little letters and the big letters side by side.

The Big and Little Letters of the Alphabet

Aa
Bb
Cc
Dd
Ee
Ff
Gg
Hh
Ii
Jj
Kk
Ll
Mm
Nn
Oo
Pp
Qq
Rr
Ss
Tt
Uu
Vv
Ww
Xx
Yy
Zz

We must learn these letters until we know them as well as we know our names, and it will help us to remember our letters if we learn the Animal Alphabet on the next page. That is an easy way of learning A B C, and we must read the Animal Alphabet, and say it over and over again until we can say it through without a mistake. Here is another way of remembering where the letters come; it is a little rhyme telling us the place of each letter:

A before B, C before D,
F after E, H after G,
I before J, L after K,
M before N, O and P then;
R after Q, then S, T, U,
V and W next come to view;
with X, Y, and Z, all the letters are said.

Then we must learn to put the letters together and make words, and we shall find it very interesting, as we get along with our lessons, to see how the letters come together to make the very words we know.

I F spells IF
I N spells IN
I S spells IS
I T spells IT
O F spells OF
O N spells ON
O R spells OR
O X spells OX
W E spells WE
B E spells BE
H E spells HE
M E spells ME
G O spells GO
N O spells NO
S O spells SO
T O spells TO

Pictures will help us to learn the words, and a clever artist has drawn some pictures to show us what the words below them mean, on p. 484

THE CHILD'S NEW ANIMAL ALPHABET

A IS THE ANT

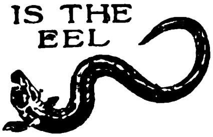
B IS THE BEE

C IS THE CAT

D IS THE DOG

as it crawls on the ground | that goes buzzing around | fast asleep by the fire | jumping higher and higher

E IS THE EEL

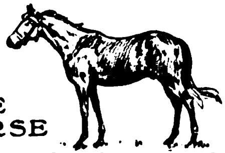


F IS THE FOX

G IS THE GOOSE

that you hardly can hold | rather cunning than bold | with its toes stretched out wide

H IS THE HORSE



I IS THE IBEX

J IS THE JAY

will you go for a ride? | that looks like a goat | with its harsh screeching note

K IS THE KANGAROO

L IS THE LION

M IS THE MOUSE

hopping along | majestic and strong | who of cheese is so fond

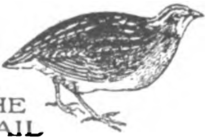
N IS THE NEWT

O IS THE OTTER

P IS THE PIG

as he swims in the pond | who feeds upon fish | with his snout in the dish

Q IS THE QUAIL



R IS THE RABBIT

S IS THE SQUIRREL

such a fat little bird | so cosilv furred | with his tail up his back

T IS THE TIGER

U IS THE UNICORN

V IS THE VULTURE

streaked yellow and black | unknown to-day | who swoops on his prey

W IS THE WOLF

X IS THE XIPHIAS

Y IS THE YELLOW-HAMMER

Z IS THE ZEBRA

that Red Riding Hood saw | with sharp-pointed jaw | just hark how it pipes! | with beautiful stripes

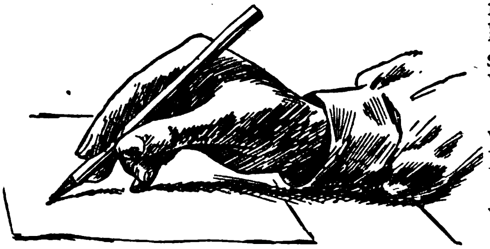
HOW TOM AND NORA LEARNED TO WRITE

"A BOX for Master Tom, and a box for Miss Nora," said the postman, as Tom and Nora came to the door one morning.

"Two beautiful boxes of crayons," said the mother, when the parcels were opened; and there, neatly tucked away in the little wooden bed, lay six coloured chalks, the very things Tom and Nora had wanted. For Tom and Nora longed to learn to write to their Cousin Jack, who lived in America, and have the letter carried thousands and thousands of miles across the sea in a ship, and over the mountains and along the great railways of the great country where the oranges grow.

"Oh, mother," cried Nora, clapping her hands, "do let us begin now! We could tell Jack all about our birthdays. May we begin at once?"

"Yes," replied their mother, "you shall start now. Bring the ruler and pencil, and Tom can ask father for some sheets of unruled paper."



How to hold your pencil when writing

These were brought, and Nora and Tom watched their mother rule two lines.

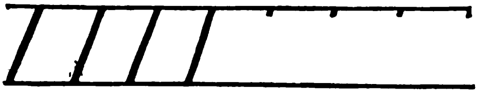
"They are like railway lines," said Tom.

"They are your crutches," said his mother.

Nora thought it very strange that Tom should want crutches, which are for lame people, because he wasn't lame at all when he ran out of the room to fetch the paper; and she laughed merrily when her mother told her she would want crutches also.

When two sets of lines had been ruled, one for Tom and one for Nora, they were told to watch how their mother held the pencil firmly between her thumb and the first two fingers, with the little finger resting on the paper, and her arm between the wrist and the elbow resting lightly on the table, as in the picture. "People hold their pens and pencils in different ways," the mother said; "but we will learn a good way, which is easier in the end. See how nicely you can make a little stroke over a stroke that I am going to make, and then make some strokes quite by yourselves. Watch me."

Then she made four strokes, nearly straight down, from the top line to the bottom one, and put little marks where the children were to start making strokes themselves. The mother's strokes, when they were finished, were like this:



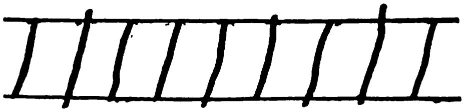
Tom and Nora wrote over their mother's strokes with their blue chalk, and then tried hard to make strokes themselves.

When they had finished, Tom said that his railway lines looked like fences leaning sideways; and Nora told her mother that she understood why the long lines were like crutches, "because," she said, "they really did help us along. Will you make us some more, please?"

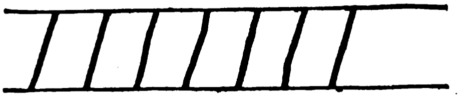
This time the mother drew two lines without the little marks where Tom and Nora were to begin.

"Write inside the lines, and find out where to begin for yourselves," she said.

"Hold your chalk more lightly, Tom; and sit up straight, Nora. Now start, and don't write too fast, or you will write badly."



Tom's strokes



Nora's strokes

When they had finished, Nora's strokes looked nicer than Tom's.

"That is because she ended them on the lines," said their mother.

Some of Tom's strokes went outside the lines, and were not quite straight. Nora kissed him and said, "Never mind, Tom; I am older than you, so I *ought* to write better."

During the next few days they wrote many rows of strokes, until they were able to make them quite straight, and the right distances apart.

Then their mother told them that they had been making the figure 1, which is the same as a stroke, and now that they could do that, they were ready to begin making a letter of the alphabet.

Nora said she would like to begin with A B C, and learn how to write all the letters she had learned; but her mother said that that was not an easy way.

"Then let me begin with N," said Nora, because her own name began with N; and Tom thought he would like to make his own letter T, though he would not say so, because he was not selfish.

But when their mother said they should make the letter i first, because that would do for all three of them, they both thought it a capital plan.

"We will learn to make i to-morrow," they said, as they put their crayons into the boxes and went off to bed themselves.

ARITHMETIC

HOW FRED AND CHARLIE COUNTED SIX

Fred and Charlie have been on a visit to their uncle's farm. They had such a good time there, and are never tired of telling us about the things they did, and the animals they saw; the cows and horses, the sheep and pigs, the ducks and geese and turkeys.

Fred and Charlie had to ride in turns, because there was only one donkey.

The first morning of their visit they got up very early, because Uncle Jack had promised to take them for a walk round the farmyard and through the fields. As soon as they had had breakfast, they started out. The first thing they saw was Jimmy, looking at them over his stable door. Jimmy was the donkey. "I should like a ride on the donkey, Uncle Jack," said Fred. "Very well, we'll see about that when we get back from our walk." But, of course, Charlie wanted a ride, too. So Uncle Jack said they would have to take turns, because there was only one donkey. First Charlie could have a ride, and then Fred, because Charlie was younger than Fred.

The plough would be very hard work indeed for one horse, so the farmers put another with it, making two horses.

The boys were so pleased at the thought of the donkey rides they could talk of nothing else till they had gone quite a long way, and come to a field where old Jake was ploughing. "Whatever is old Jake doing, Uncle?" asked Fred.

"He is ploughing," said Uncle Jack, "making the ground ready for sowing the corn. The field is too big for a man to dig it all with a spade, so it is done with a plough. You can see how the plough turns the soil over, as the horses drag it along. It would be very hard work for one horse, so we put another one with it."

"I know how many horses that makes," said Fred. "Charlie doesn't, because he's never been to school, so he can't count."

"Well, you tell him how many horses it makes, and he'll soon learn."

"Why," said Fred, "one horse and one horse make two horses."

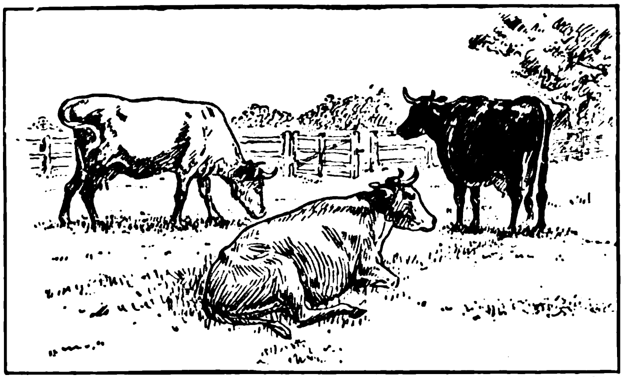
"Quite right. And if you have a ride on the black horse, and a ride on the grey horse, as well as a ride on the donkey, how many rides will that be?"

"Three rides," said Fred. "Two rides on the horses and another one on the donkey make three rides altogether."

"That's the way; we shall soon teach Charlie to count."

By this time they had come to the meadows. "I believe Charlie can tell us how many cows there are standing by the gate," said Uncle Jack.

"Oh, yes!" answered Charlie. "There's one lying down,



There were some cows at the gate. One cow was lying down, another was eating the grass, and another standing looking at the boys made three.

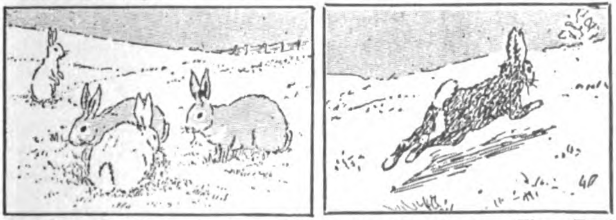
and another one eating the grass. That makes two. And there's another one standing looking at us. That makes three."

And so they went along, with Charlie, I am afraid, thinking a great deal more about donkey rides than about learning to count. Still, you see, he was learning, because he remembered, after seeing the plough, that one horse and one horse made two horses, and that a ride on each of the horses and a ride on the donkey as well made three rides altogether; and so he was able to tell Uncle Jack that one cow lying down, one cow eating the grass, and one cow standing looking at them made three cows altogether. Presently, as they came through a gap in the hedge, Charlie saw something else that he could count—one, two, three little rabbits.

Going home, Charlie counted five crows looking for something to eat, and just as he had said "One, two, three, four, five," down came one crow and made six.

"Oh, I can see more than that!" said Fred. "There's another one sitting up a little way from the others. That makes four."

But the boys made such a noise that the rabbits were frightened, and ran away as fast as they could. Now, when rabbits run away it is very easy indeed to see them, because they have such white tails; so it turned out that there was another one yet, besides the four that Fred saw, and, as Uncle Jack said, that made five.



Presently Charlie saw some rabbits—one, two, three. Then Fred caught sight of another sitting up a little way off. That made four. But the boys were so excited that they almost missed another little rabbit running away, and, as Uncle said, that made five.

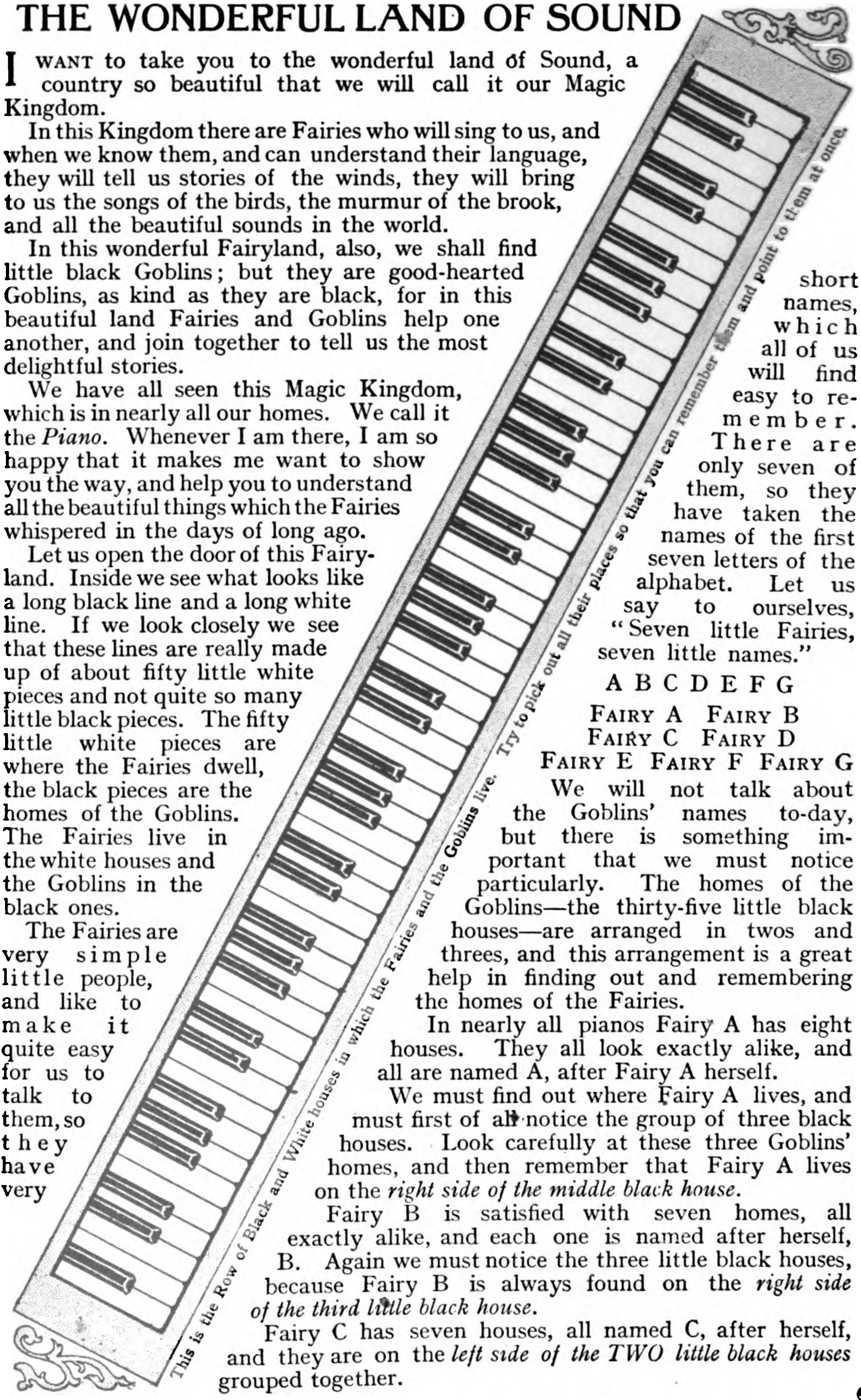
Charlie was really getting on fast with his counting now. Three rabbits and one rabbit more make four; four rabbits and one more make five. Before they got home again he was able to count as far as six. He counted five crows, busy looking for something to eat, and just as he had said "One, two, three, four, five," another crow came down from the tree where it was sitting, so that now there were six of them. Charlie was very pleased indeed with himself when he found he could count as many as six things. He was busy with his counting on the way home, and his uncle gave him this little rhyme to help him to remember up to six:

One, two, the cock crew.
Three, four, hear the bull roar.
Five, six, the clock ticks.

"I can make a better rhyme than that," said Fred.

One, two, we are going to the Zoo.
Three, four, we shall hear the lion roar.
Five, six, see the monkey at his tricks.

THE WONDERFUL LAND OF SOUND



This is the Row of Black and White houses in which the Fairies and the Goblins live. Try to pick out all their places so that you can remember them and point to them at once.

I WANT to take you to the wonderful land of Sound, a country so beautiful that we will call it our Magic Kingdom.

In this Kingdom there are Fairies who will sing to us, and when we know them, and can understand their language, they will tell us stories of the winds, they will bring to us the songs of the birds, the murmur of the brook, and all the beautiful sounds in the world.

In this wonderful Fairyland, also, we shall find little black Goblins; but they are good-hearted Goblins, as kind as they are black, for in this beautiful land Fairies and Goblins help one another, and join together to tell us the most delightful stories.

We have all seen this Magic Kingdom, which is in nearly all our homes. We call it the *Piano*. Whenever I am there, I am so happy that it makes me want to show you the way, and help you to understand all the beautiful things which the Fairies whispered in the days of long ago.

Let us open the door of this Fairyland. Inside we see what looks like a long black line and a long white line. If we look closely we see that these lines are really made up of about fifty little white pieces and not quite so many little black pieces. The fifty little white pieces are where the Fairies dwell, the black pieces are the homes of the Goblins. The Fairies live in the white houses and the Goblins in the black ones.

The Fairies are very simple little people, and like to make it quite easy for us to talk to them, so they have very short names, which all of us will find easy to remember. There are only seven of them, so they have taken the names of the first seven letters of the alphabet. Let us say to ourselves, "Seven little Fairies, seven little names."

A B C D E F G

FAIRY A FAIRY B
FAIRY C FAIRY D
FAIRY E FAIRY F FAIRY G

We will not talk about the Goblins' names to-day, but there is something important that we must notice particularly. The homes of the Goblins—the thirty-five little black houses—are arranged in twos and threes, and this arrangement is a great help in finding out and remembering the homes of the Fairies.

In nearly all pianos Fairy A has eight houses. They all look exactly alike, and all are named A, after Fairy A herself.

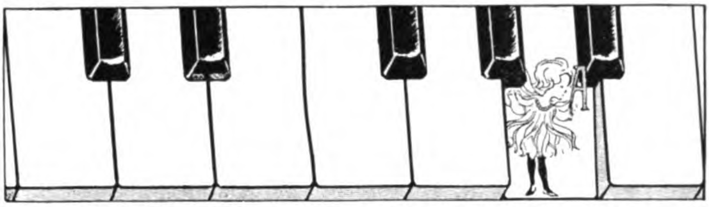
We must find out where Fairy A lives, and must first of all notice the group of three black houses. Look carefully at these three Goblins' homes, and then remember that Fairy A lives on the *right side of the middle black house*.

Fairy B is satisfied with seven homes, all exactly alike, and each one is named after herself, B. Again we must notice the three little black houses, because Fairy B is always found on the *right side of the third little black house*.

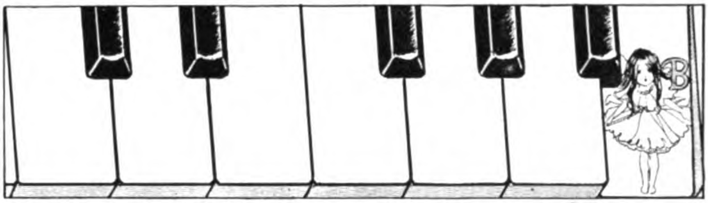
Fairy C has seven houses, all named C, after herself, and they are on the *left side of the TWO little black houses* grouped together.

HOMES OF THE SEVEN LITTLE FAIRIES

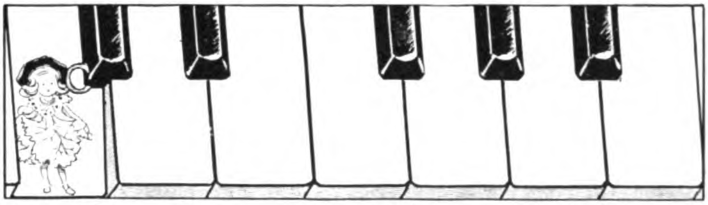
To the
Home
of
FAIRY A



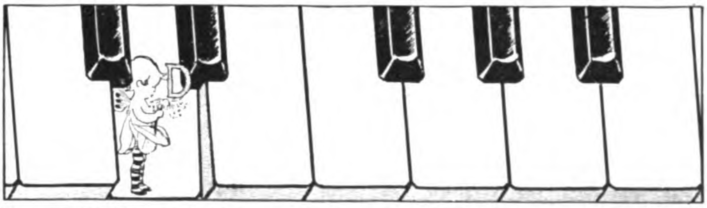
To the
Home
of
FAIRY B



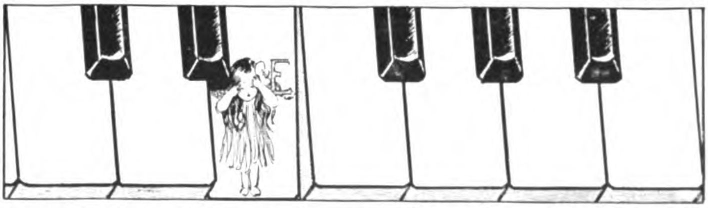
To the
Home
of
FAIRY C



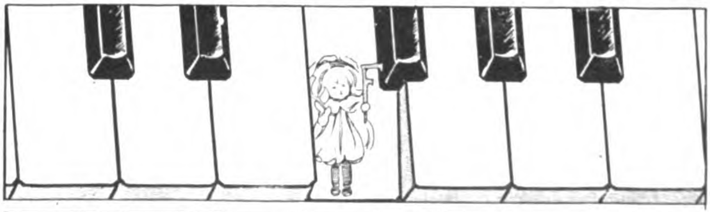
To the
Home
of
FAIRY D



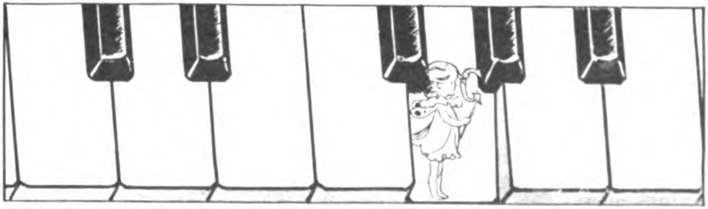
To the
Home
of
FAIRY E



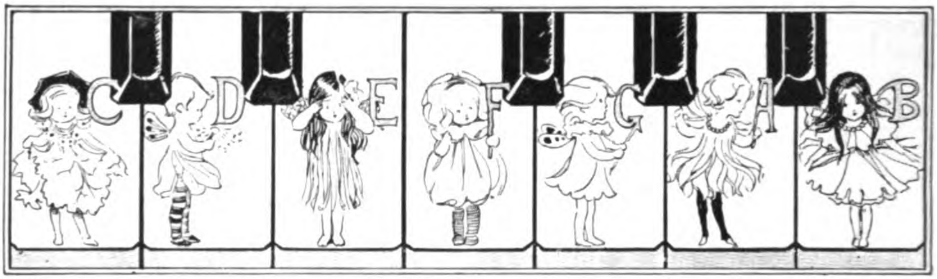
To the
Home
of
FAIRY F



To the
Home
of
FAIRY G



These pictures show you the seven little Fairies in their homes, each Fairy carrying her name with her. **Notice** how the little black houses of the Goblins that guard the fairy houses are arranged in twos and threes.



Here again are the seven little Fairies, all in their homes in the Land of Sound—A, B, C, D, E, F, G

Fairies D, E, F, G have also seven homes each, and each of these little houses bears the name of the Fairy to whom it belongs. Let us see where they live.

Look again at the little group of two Goblins' houses. The little Fairy living *between these two black houses* is Fairy D, and wherever we see just two Goblins together we can be quite sure that Fairy D is to be found between them.

Fairy E feels that she wants to be one of this happy party, and she has her home next to D, so that Fairy E is on the *right side of the second black house.*

Fairy F and Fairy G like a group of three Goblins, so Fairy F lives on the *left of the first of the three black houses,* while Fairy G lives next door to her, on the *left side of the middle black house.*

Now we have found out where all the little Fairies live. Let us look at the pictures very carefully, and then go to the Piano, and see if we can find the little houses all ready and waiting for us there.

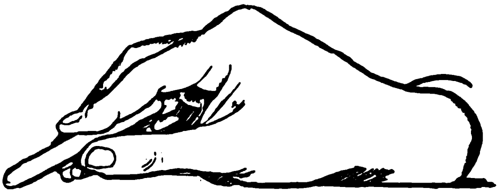
Every day we will enjoy a real game of play with the Fairies and Goblins in the Magic Kingdom. We can think we are the postmen of Fairyland, and each morning we must take the Fairies their letters, being sure to go to the right houses, and careful not to forget any of our little friends.

DRAWING

HOW TO MAKE YOUR FIRST PICTURE

Would you like to learn how to draw, and to be able to make pictures of the things you see?

It is really easier to learn how to draw than to learn to write, though it isn't easy at first to draw things like houses, or horses, or cows. Yet all the lovely pictures that hang on the walls are drawn by people who once found it difficult to hold a pencil or a chalk.



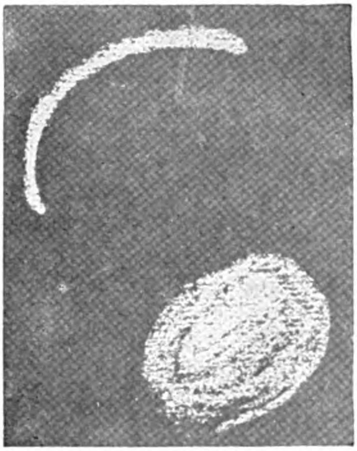
How to hold your chalk when drawing

Some day, perhaps, you will be able to make beautiful pictures, too. Would you like to begin to-day and see what you can do?

You must get two large pieces of paper, one brown and the other white. Ordinary brown parcel paper will do quite well; the best white paper for you at present is called cartridge paper. Then you must get some white and some coloured chalks. If you have a paint-box, you must learn to use it, and I hope it is the kind of box that has moist colours in pans or in tubes. You must have a jar of clean water ready, and your paint-box must be quite clean, too. No one can paint with dirty colours or brushes.

If you can find a drawing-board and four drawing-pins, you can fasten your sheet of brown paper to the board at each corner; but if you have not a board, you should use a big book with a smooth cover. Put a box or another book under the end of the board; this makes the paper slant a little, and saves you from having to stoop. It is bad for your eyes and back to stoop over your work.

When everything is ready, choose something easy to draw. Suppose you get an orange, or an apple, or an egg, and put it a little way in front of you on the table. Then take a nice thick piece of white chalk. It is very difficult to hold it properly at first, especially if you have learnt how to write, because the right way to hold a chalk is quite different from the way in which we hold our pens. The fingers must not be close to the point of the chalk, but half-way down, as we see in the picture. Don't hold your chalk too tightly, and if your fingers feel stiff and ache at first, do not mind that, but try very hard to hold it right—it is very, very important.



The right way and the wrong way to begin with chalk. Do not chalk in single lines, but rub the chalk round and round.

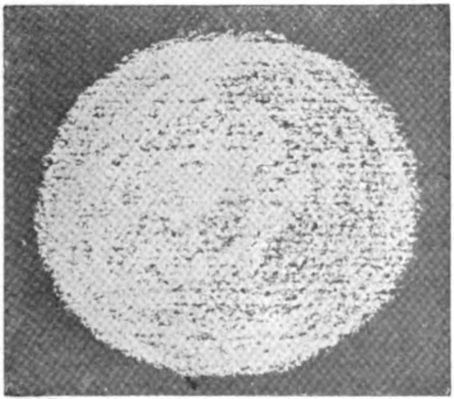
When you can manage to hold the chalk in the proper way, you can begin to copy what you have chosen. Do not make a thin line with the point, but let the side of the chalk touch the paper, and rub it round and round till you get something like the shape you are copying. Take care that it is not too small; all your drawings must be big. It is much better that they should be too big than too little. If you hold the chalk in the right way it will be easier to rub it round and round, and it will not take so long to get the right size as it would if you held your fingers close up to the point.

The pictures show you the right way and the wrong way to begin. If your first drawing does not look good, do not try to rub it out, but make it over and over again till you get it right. If you are drawing an orange, make it a little flat at the top and the bottom. An egg is rather long, and thicker at one end than at the other. Apples are all sorts of funny shapes, not any of them quite round, and you can often see the stalks.

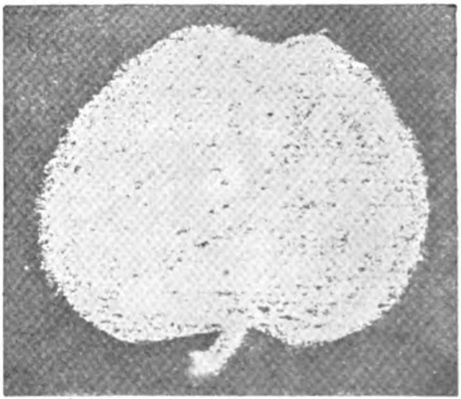
I have made a picture of each one to show you how they ought to look, but you must copy the real things for yourselves, and not my drawings.

When you have made a good picture, you can put the brown paper away, and choose a white piece. If you are drawing an orange, try to find a piece of coloured chalk exactly the right shade of yellow, and draw with it on the white paper, beginning in exactly the same way as you did before. See that you are holding the chalk properly. An apple must have green and red chalk, too, if it has a rosy cheek. You cannot draw a white egg with white chalk on white paper, because it would not show, but some eggs look brown or pink, and you can draw these if you can find chalks to match the colour.

If you want to use your paint-box, remember it must be quite clean before you begin. Take a rather thick brush. Some brushes are good and some are bad. The best brush for you to use at present



This is how the orange should look in chalk



This is how the apple should look in chalk costs only a few cents at the most. If it has any loose hairs, or if some of them are longer than others, it is a bad brush, and you had better not try to use it, as these hairs will make lines where you do not want them. A good brush will have the hairs so arranged that you will be able to draw them all smoothly together to a point after you have dipped it in the water.

If your paint-box has hard cakes of paint, you must first put a little water in a clean saucer and rub the hard cake well in it until you have enough colour mixed. If your box has moist colours in pans, you must first dip the brush in water and then in the colour, and you should then put as much colour as you want to use in the tin lid of the box. Tube colours must be used carefully, and the tube should be squeezed very gently at the bottom. Put out only a little colour, and always put on the little cap again when you have squeezed any colour out.

This shows an apple and how to begin to paint it

For the apple you must mix blue and yellow together. There are different blues and yellows in your box, and you must try which will make the green most like the colour you want.

If the apple has a red cheek you must choose the proper red, and mix both colours—the green and the red—ready in separate parts of your paint-box or saucer. The orange must have bright yellow, and if the yellow in your box is too pale, mix a little red with it till you get the right shade. For the pink or brownish egg, you must take a little brown or red paint, made pale with water. Never use Chinese white or any white paint when you are painting on white paper. If your paint is too dry it will make your work look smeary, and if there is too much water in it it will run all down the paper.

Hold your brush rather low down, and try to paint from one copy. Do not make any lines with your brush, but begin in the same way as you began with your chalk. Paint as smoothly as you can, and do not go over the same place twice, or go up and down with your brush.

It is rather difficult at first to paint anything that has two colours, like the rosy apple. I will tell you how to do it, and you can try, but do not be surprised if it does not look right the first time.

Put the green paint all over in the shape of the apple first, and wait a little while. Then take some bright red paint, with only a very little water in it, on the point of a clean brush. Before the green paint on your apple is quite dry, touch it with the point of this brush in the place where the rosy cheek is. The red paint will run into the green and look very nice if you have done it carefully.

Little Japanese girls and boys write all their letters with a paint-brush and black paint, and so it is easier for them to hold their brushes properly, because they have so much practice. If you ask someone to show you some Japanese pictures it will help you to do your own.

If you have found all these things easy to do, you can try to make a dish of fruit or to draw an egg in an egg-cup, but it is much better to do a little at a time and a little every day. It is a very good plan to see if you can remember what you have drawn, and to do it over again without looking at the thing itself; and another good plan is to test your drawing by asking your friends to guess what it is.

LITTLE PICTURE-STORIES IN FRENCH

YOU will not be able to learn to speak French from these lessons. There are some sounds in French which cannot be made clear on paper, and you will only be able to understand these by hearing them spoken. But these lessons will help you very much if you are learning French at school, or if there is someone at home who can help you to understand how the words should be said. The French people say E just as we say A, and say I just as we say E. But there are some sounds which are not so easy to learn as these, and it will be better to ask someone to help you when reading these little lessons than to try to learn all these difficult things yourself, however hard we might try to make them easy for you. These lessons tell us the story of a visit to France and of the visitor's doings among the French people, and the pictures help to make the language quite clear. The first line under the picture is the French. The second line gives the English word for the French word above it. But the French people do not always put their words together in the same way as we do, and the third line shows how we make up the words into our own language.

Louis

Je m'appelle Louis, et j'ai dix ans
I myself call Louis, and I have ten years
My name is Louis, and I am ten years old

Jeannette—Jenny

Ma sœur Jeannette a huit ans
My sister Jenny has eight years
My sister Jenny is eight years old

Bébé—Baby

Mon petit frère a deux ans
My little brother has two years
My little brother is two years old

On l'appelle Bébé
One him calls Baby
He is called Baby

L'école—The school

Jeannette et moi nous allons à l'école
Jenny and I we go to the school
Jenny and I go to school

Maintenant nous sommes en vacances
Now we are in holidays
Now we have a holiday

Maman—Mamma

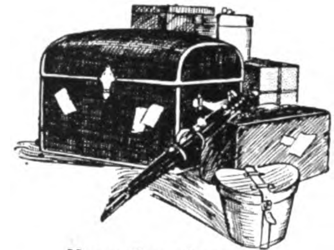
Papa

Nous allons en France
We are going in France
We are going to France

Nous allons avec papa et maman
We are going with papa and mamma
We are going with papa and mamma

La bonne—The nurserymaid

Bébé va venir et la bonne aussi
Baby is going to come and the nurse also
Baby is going and nurse also



Nos malles—Our trunks

Notre bonne a fait toutes nos malles
Our nurse has made all our trunks
Our nurse has packed all our trunks

Nos jouets sont dans la grande malle
Our toys are in the large trunk
Our toys are in the large trunk

Nos jouets—Our toys

Nous avons beaucoup de jouets
We have many of toys
We have many toys

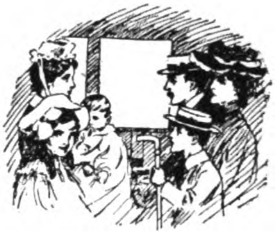
Bébé emporte son bateau à voiles
Baby is taking his sailing boat
Baby is taking his sailing boat

Le fiacre—The cab

Le fiacre est à la porte
The cab is at the door
The cab is at the door

Le cocher—The driver

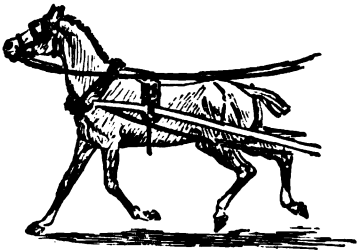
Le cocher met les bagages sur le fiacre
The driver puts the luggage on the cab
The driver is putting the luggage on the cab



Dans le fiacre—In the cab

Nous sommes six dans le fiacre
We are six in the cab
There are six of us in the cab

1	2	3
Un	deux	trois
One	*two*	*three*
4	5	6
quatre	cinq	six
four	*five*	*six*



Le cheval—The horse

Le cheval marche très bien
The horse goes very well
The horse goes very well

Nous aimons aller en fiacre
We like to go in cab
We like riding in a cab

La gare—The station

Nous arriverons bientôt à la gare
We shall arrive soon at the station
We shall soon arrive at the station

Our next School Lessons begin on page 483

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